



Observing Selected Shakhbazian Groups

Faint Compact Galaxy Groups

Alvin Huey
FaintFuzzies.com

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www.FaintFuzzies.com

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The Shakhbazian Compact Galaxy Groups Catalogue and Observing Project

In 1957, Romela Shakhbazian examined a Palomar Sky Atlas plate and noticed a tight group of red objects. She examined more plates and found 16 more such groups and all were about 1' in diameter, so she wrote a journal article on it.¹ It was believed at that time it was a small tight cluster of red stars. It wasn't until 15 years later in 1972, when Robinson and Wampler took a closer look and the spectra of five objects in the first listed group that Shakhbazian looked at and realized that they were not red stars, but galaxies.² They named it Shakhbazian 1 to represent a new system of galaxies called compact clusters of compact galaxies.

In 1973, several others took a new systematical search to look for more compact clusters of compact galaxies on the Palomar Sky Survey. The following criterion must be met to be considered for the new system of galaxies:

1. Consists of 5 to 15 members.
2. Each galaxy's apparent magnitude is between 14th to 19th magnitude.
3. Compact group. Relative distances of member galaxies should be 3/5 of the diameter of a galaxy.
4. Almost all must be extremely red. No more than two blue galaxies.
5. Galaxies must be compact, high surface brightness, and not diffuse.
6. The group must be isolated.

It turned out that one of the richest groups is the first one, Shakhbazian 1. The spectra of five objects in Shakhbazian 1 calculated the distance to be about 2 billion light years distant with a diameter of 620,000 light years across and the average diameter of individual galaxies was just 40,000 light years across.³ In comparison, the Milky Way and Andromeda Galaxy were about 100,000 and 130,000 light years across respectively, and 2.2 million light years from each other. It was also found that the absolute magnitude of the brightest member of Shakhbazian 1 is -23.0, which means that it was one of the brightest known galaxies. That would make Shakhbazian 1 a compact group of high-luminosity galaxies close to each other. The velocity dispersion is very low, suggesting that they are together in one compact group. Imagine what that would look like for the deep sky observer from one of the member galaxies! 5+ high luminosity galaxies crammed into a "small" 620,000 light year space.

Then in 1975 Mirzoyan, Miller, and Osterbeck took a closer look at Shakhbazian 123 and determined that it has similar characteristics to Shakhbazian 1.⁴ They thought they were onto something. Further research on other Shakhbazian groups showed that the pattern of small velocity dispersion properties was indeterminate.

After research from 1972 to 1979, it was demonstrated that most Shakhbazian groups are in one of the following types of groups:

1. Spherical concentrated groups
2. Chains
3. Peripheric groups

Later observations of these groups with high angular resolution revealed that member galaxies were mostly of E and S0 types, which were high surface brightness galaxies. This can be helpful for visual observers as it was

¹ Romela K. Shakhbazian. Compact groups of compact galaxies. *Astrophysics* (Vol. 9, 1973), 296-30

² Lloyd B. Robinson and E. Joseph Wampler. Shakhbazian I: A Distant Cluster of Compact Galaxies. *The Astrophysical Journal* (Vol. 179, Feb 1, 1973), L135-L139

³ Tiersch, H. Compact Groups of Compact Galaxies. *Astronomische Nachrichten*. (Vol 297, Iss 6, 1976), 301

⁴ Tiersch, H. Compact Groups of Compact Galaxies, 301

detectable even at 2 billion light years distant. Also, it has now been shown that the group members were not particularly compact, so the more recent journal articles now call them Shakhbazian Compact Galaxy Groups (Shk).

By 1979, the catalogue grew to 377 and was compiled by Shakhbazian, Petrosian, Baier, and Tiersch. They produced 10 journal articles, see Additional Resources on page 139 for bibliographic details. The unfortunate thing was that the coordinates of the groups in the original journal articles given were relatively low accuracy, so more than a few of the Shk groups were difficult to discern in galaxy-rich fields. The good news, almost 20 years later, D. Stoll and team put out ten papers on the photometry and the identification of each member of the groups.⁵ I have used his papers to center and mark the members in this guide. It also turned out that because of the quality of the Palomar plates, some members were faint red stars, not galaxies. So, in this observing guide, I edited the number of “members” based on Stoll’s papers whether they were galaxies or stars, and corrected the coordinates to the approximate center of the Shk Groups. Some were as far as 5’ off, which made identification difficult without Stoll’s papers. I’m grateful for his work. I’ve used the Sloan Digital Sky Survey (SDSS) where available to mark galaxies or stars, where available. When Stoll did his work, SDSS was not available at the time.

Two decades after Stoll, et al work, more and improved data and improved sky survey imagery were made available, thus researchers, such as H.M. Tovmassian, did more research on the Shakhbazian groups and determined that a percentage of the original 377 groups were “false” groups.⁶ They were mostly stars or galaxies with redshifts differing from each other. Differing redshifts mean that the galaxies were at different distances from us and, therefore not associated with each other. And there was a small percentage that was part of a larger cluster of galaxies. In my guide, I’ve left out the “false” groups and left in the Shk groups that are part of a larger galaxy cluster.

For this observing guide, I have included 122 of 377 Shakhbazian groups to give a sampling of what is observable with large amateur telescopes. This list is not for the faint of heart but presents an extreme challenge even for those with a 30” reflector or those with electronically assisted astronomy equipment.

Shakhbazian Groups Catalogue is a very challenging visual observing program. Here are some observing tips that will hopefully improve your chances of seeing them:

- A steady sky is key for resolving individual members.
- Take great care when looking. Stars appear brighter in the eyepiece than the stars on the DSS and SDSS images and gives false positives. Examine the provided annotated images and note the locations of the foreground stars.
- Keep your eyes dark adapted as fully as possible. Even the sky glow from the sky, especially if the Milky Way is above the horizon, can impact your night vision. When not looking at the eyepiece, waiting for your turn at the eyepiece, or just taking a break, look down at the dark ground, preferably with a hood over your head. I sometimes look down for a few minutes before looking in the eyepiece.

⁵ The first of the ten journal articles is D. Stoll, H. Tiersch, H. Oleak, and F. Baier. Photometric catalogue of Shakhbazian Compact Groups of Galaxies. I. *Astronomische Nachrichten*. (Vol 314, No. 4, 1993), 225-267. See page 139 for bibliographic details of all ten articles.

⁶ Tovmassian, H.M., Torres-Papaqui, J.P., Tiersch, H. Isolated Shakhbazian Compact Groups. *Астрофизика*, (Vol 53, No. 3, 2010), 353-362

- To further darken the field around you, use a hooded vest. The hood should block all extraneous light, including the sky glow and even the Milky Way at very dark sites.
- Use your eyepiece guards. They offer an extra light blocking barrier between your eyepiece and your eye. If your eyepiece doesn't come with one, you can install one for some eyepiece. See my website at faintfuzzies.com/ObservingAids.html for some ideas.
- If you think you saw the object(s), but are not sure, gently tap the telescope or wiggle it. The stars will wiggle in the eyepiece, and if you saw the object, it would wiggle as well along with the foreground stars.
- If you are tired, you won't see as much. Take a nap or rest. Try to observe in a comfortable position. It helps if you aren't straining your neck (or anything else) when you are trying to observe. Some fleeting objects would disappear when fatigued.
- Use high magnification, such as 300x or even higher. When I observe objects from this list, I generally use my 6mm ZAO-II, 5mm BGO, and/or 4mm ZAO-II orthoscopic eyepieces in my 22". I employ the TMB 1.8x ED Barlow if I need even more magnification.
- Use low-glass count and high transmission eyepieces. Even with modern glass polish and coating technology, there is still a very small, but noticeable difference between high glass count eyepieces, such as the common wide-field eyepiece versus a simple Orthoscopic or Plössl. Over the years, I've done comparisons between various eyepieces, such as the Naglers, Ethos, Naglers, Pentax XW's, Orthoscopics (Zeiss, Baader, University Optics, etc.), and Plössl (some makes) and found that low-glass count eyepieces consistently outperform high-glass count eyepieces. See my website under Observing Tips, titled Going DEEP with simple eyepieces, for more information.

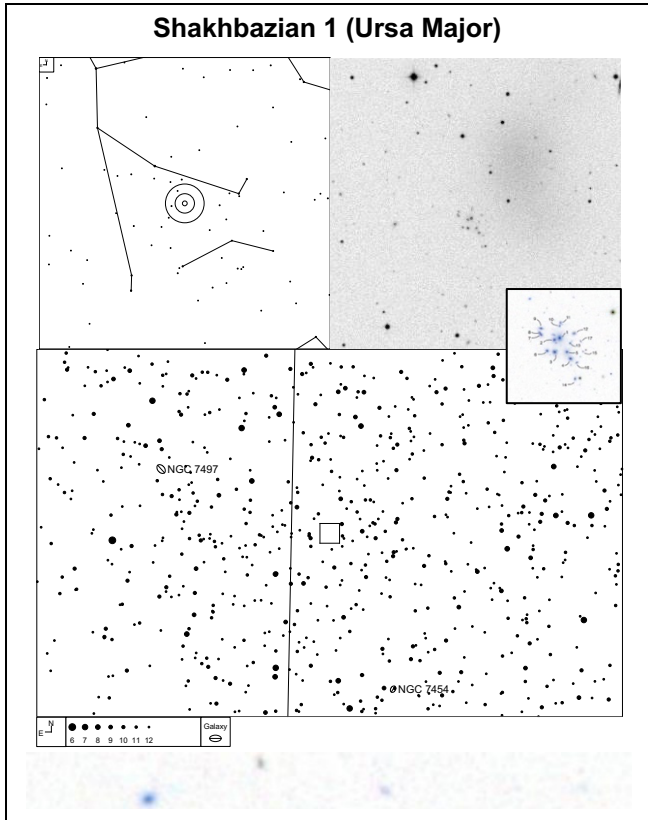
When you observe these Shakhbazian Compact Galaxy Groups, let others know and encourage them to take on this challenging observing project.

Post your observations at www.deepskyforum.com and I'm sure that other "extreme" deep sky observers would like to read them.

Any feedback or suggestions would be greatly appreciated. I strive to be as accurate as possible. Are there any other Shk groups you feel that should be included? Let me know.

I hope to keep this resource updated and made available to you, the deep sky observer.

How to Use the Atlas



The top left panel contains the naked eye field with the TelRad™ superimposed on the center of the Shakhbazian Compact Galaxy Group. The top right panel contains the inverted DSS image. The image is generally 10' square, otherwise 15'.

The bottom panel is a finder field of about 4.8° across and 3.0° high. The finder field is wide enough for the finder scope and detailed enough for those who choose to use a low-power eyepiece as a “finder”. The limiting magnitude of the field stars is generally set to 12.0 but set to a lower limit in star-rich regions. A magnitude scale is provided on the bottom left. The field of the DSS image is superimposed on the finder chart. An inverted SDSS image, if available, is provided on the middle right.

The inset images are marked for member galaxies based on D. Stoll's journal articles.

A table is provided at the bottom of each page listing the following basic information:

- **Object** – The listed catalog name of the brightest member(s), if one exists.
- **RA and Dec** – coordinates of approximate center of the group in Epoch 2000.0. I've corrected the RA and Dec from the original papers.
- **#** - the number of galaxies as listed in Stoll's papers.
- **Mag** – magnitude of the brightest member. The magnitude figures with an * are from Stoll's papers, otherwise from SDSS or NED. Sources: Stoll's paper, SDSS, or NED.
- **Size** – the listed size of the group. Source Shakhbazian's original papers and list from CDS.
- **Cmpt** - the ratio of the sum of the diameters of all the galaxies of the group to the diameter of the group. The higher the number, the “richer” the group. Source VizieR.

The Atlas is arranged starting with Pegasus and then working eastwards. The Shk groups are then grouped by constellation in RA order. I have arranged it this way, so it is easier to observe multiple Shk groups within an observing session. Just turn to the section where the constellation is high in the sky and go from there.

Selected Shakhbazian Compact Galaxy Group Catalogue

Page	Shk	Other	RA	Dec	#	Mag	Size	Cmpt	Const	Paper
16	361	AGC 2524	23 03 18	+17 41 13	11	15.9	2.8'	0.5	Peg	X
17	362	III Zw 108	23 32 37	+19 21 34	9	16.6	0.9'	1.2	Peg	X
18	82		23 13 42	+01 46 12	5	17.66*	0.9'	0.7	Psc	I
19	83		23 26 12	-01 43 48	9	18.02*	1.9'	0.4	Psc	I
20	27		23 32 43	+01 33 15	10	17.45*	3'	0.4	Psc	I
21	84		23 34 38	+07 59 35	6	17.2	1.3'	0.4	Psc	VI
22	30	Hickson 97	23 47 23	-02 18 03	11	13.88*	4.5'	1	Psc	I
23	31		00 58 18	+13 54 39	7	17.6	1'	0.6	Psc	V
24	38	PGC 4212	01 10 52	+08 19 21	6	17.1	1.1'	0.5	Psc	V
25	39		01 17 48	+09 51 49	13	16.8	3.3'	0.4	Psc	V
26	40	IC 1695 (AGC 193)	01 25 07	+08 41 59	60	14.9	-	-	Psc	V
27	41		01 29 01	+07 40 30	9	15.6*	0.9'	0.8	Psc	V
28	43		01 38 25	+08 31 12	9	16.5	3.5'	0.4	Psc	V
29	44		01 40 53	+02 51 01	11	16.7	2.8'	0.4	Psc	V
30	262		00 08 42	-11 58 18	14	17.10*	3.4'	0.4	Cet	I
31	309		00 51 21	-07 24 17	14	17.49*	6.7'	0.2	Cet	III
32	310		00 54 52	-03 43 22	10	17.05*	2.2'	0.6	Cet	III
33	265		00 57 11	-14 01 47	11	17.41*	3'	0.4	Cet	II
34	32		01 01 48	-01 34 48	13	18.54*	3.3'	0.4	Cet	I
35	35		01 05 45	-00 44 57	6	16.58*	0.8'	0.9	Cet	I
36	266		01 32 38	-09 48 56	7	17.81*	2.7	0.3	Cet	II
37	270		02 08 40	-13 57 49	10	16.88*	4'	0.3	Cet	II
38	317	MCG-1-6-64	02 10 53	-06 33 33	7	15.25*	6.1'	0.2	Cet	IV
39	278		04 05 36	-12 58 48	7	17.33*	1.2	0.6	Eri	II
40	279		04 12 53	-08 29 23	7	16.48*	3.4'	0.4	Eri	II
41	181		08 28 01	+28 15 56	15	16.8	3'	0.4	Cnc	VIII
42	182		08 38 18	+29 45 22	11	17.00*	3.6	0.3	Cnc	VIII
43	345		09 12 29	+15 06 11	8	17.45	2	0.5	Cnc	X
44	344		08 47 33	+03 42 01	8	16.1	2.9'	0.4	Hyd	X
45	346		09 15 10	+05 14 21	8	17.9	1.2'	0.8	Hyd	X
46	348		09 26 35	+03 26 40	11	16.1*	2.7'	0.5	Hyd	X
47	95		08 28 38	+50 17 46	6	16.5	1.1'	0.8	Lyn	VI
48	18		08 53 52	+79 09 43	12	15.6*	0.7'	1.3	Cam	V
49	17		09 05 51	+77 39 03	8	16.3*	0.6'	0.8	Cam	V
50	98		08 52 08	+53 36 49	10	16.7	3'	0.3	UMa	VI
51	104		09 27 15	+52 58 29	6	17.8	1.2'	0.4	UMa	VI
52	105		09 41 37	+62 01 56	11	16.5	2.6'	0.3	UMa	VI
53	113		10 21 06	+61 12 04	9	17.7	1.5'	0.4	UMa	VII
54	53	AGC 1050	10 36 51	+44 48 32	15	17.2	-	-	UMa	V
55	54	AGC 1067	10 40 36	+40 14 00	22	16.5	5.5'	0.5	UMa	V
56	55		10 43 35	+48 22 30	9	17.2	1.5'	0.6	UMa	V
57	57	III Zw 20	10 45 27	+49 31 38	8	18.0	-	-	UMa	VI

Page	Shk	Other	RA	Dec	#	Mag	Size	Cmpt	Const	Paper
58	1	PGC 32808	10 55 05	+40 27 14	17	16.0	1.4'	1.1	UMa	R&W
59	119		11 01 21	+37 40 44	6	17.81*	1.2	0.5	UMa	VII
60	26	MCG+8-20-69A (AGC 1143)	11 02 12	+50 20 58	9	17.2	1'	0.7	UMa	V
61	120	AGC 1151	11 04 28	+35 52 45	10	16.8	1.6'	0.5	UMa	VII
62	237	CGCG185-3	11 05 28	+37 59 48	7	15.5	2.46'	0.4	UMa	IX
63	7		11 05 54	+39 47 08	7	17.5	0.8'	0.7	UMa	V
64	3	VV153	11 15 54	+53 45 10	6	18.9	-	0.4	UMa	V
65	5	Hickson 50	11 17 06	+54 55 01	5	18.4	0.7'	1	UMa	V
66	6	AGC 1218	11 18 48	+51 44 26	7	16.8	1.7'	0.7	UMa	V
67	60		11 24 36	+40 25 15	9	17.0	1.6'	0.5	UMa	VI
68	63		11 29 36	+42 26 25	6	16.0	0.9'	0.7	UMa	VI
69	199		11 35 20	+30 43 24	13	16.72*	4.7'	0.3	UMa	VIII
70	67		11 43 36	+41 22 48	7	16.6	1.3'	0.6	UMa	VI
71	2		11 43 46	+51 25 21	9	18.0	1'	1	UMa	V
72	123		11 44 47	+57 31 59	11	16.7	1.9'	0.5	UMa	VII
73	128		13 19 55	+55 45 22	7	17.2	0.8'	0.6	UMa	VII
74	166	UGC 10638 (AGC 2247)	16 52 48	+81 37 54	10	14.88*	7.9'	0.5	UMa	VII
75	49	MAC 1015+3855	10 15 15	+38 55 12	7	16.8	1.2'	0.5	LMi	V
76	51		10 30 33	+39 12 33	12	16.1	5'	0.3	LMi	V
77	191	AGC 1097	10 48 09	+31 28 22	25	15.2	3.9'	0.6	LMi	VIII
78	186		09 22 52	+28 55 25	5	16.9	1.1'	0.6	Leo	VIII
79	188		09 56 59	+26 10 27	12	16.2	3.4'	0.3	Leo	VIII
80	350		11 00 02	+08 24 26	6	17.04	1.9	0.5	Leo	X
81	318		11 09 37	-04 20 58	5	17.64*	0.6'	0.6	Leo	IV
82	351		11 10 19	+04 47 32	8	15.8	2.5'	0.5	Leo	X
83	320		11 14 46	-06 22 28	10	17.37*	4.7'	0.2	Leo	IV
84	352	CGCG 39-135	11 21 40	+02 53 33	11	15.5	2.7'	0.8	Leo	X
85	154	AGC 1238	11 22 54	+01 06 52	14	16.37*	2'	0.9	Leo	I
86	322	AGC 1248	11 23 41	-04 13 03	5	16.17*	1.3'	0.5	Leo	IV
87	371		11 43 33	+21 53 57	5	17.6	0.9'	0.4	Leo	X
88	202	CGCG 158-74	12 19 52	+28 24 20	15	14.6*	11'	0.2	Com	VIII
89	245		12 24 46	+31 57 13	8	15.6*	4.47'	0.2	Com	IX
90	205		12 35 23	+27 34 29	14	15.4*	4.5'	0.4	Com	VIII
91	374		13 15 58	+21 26 11	5	17.29	1.3'	0.4	Com	X
92	9		13 24 05	+19 02 01	7	17.1	2.5'	0.7	Com	V
93	19	Rose 13 / VV 678	13 28 30	+15 50 22	5	17.0	0.35'	2.1	Com	V
94	244		12 17 09	+35 17 11	10	16.67	2.27	0.3	CVn	IX
95	212		13 37 06	+28 06 08	6	18.10	1.1	0.6	CVn	VIII
96	253		13 52 24	+37 31 00	13	16.5	2.22'	0.7	CVn	IX
97	254		13 56 25	+35 11 10	11	17.4	3.35'	0.3	CVn	IX
98	251		13 36 52	+36 50 22	8	16.49*	3.35'	0.3	CVn	IX
99	323		12 19 17	-07 24 13	7	17.19*	1.2'	0.5	Vir	IV
100	355		13 12 11	+07 18 29	6	17.27*	0.6'	1	Vir	X

Page	Shk	Other	RA	Dec	#	Mag	Size	Cmpt	Const	Paper
101	357	AGC 1773	13 42 09	+02 13 38	15	16.35*	7.1'	0.9	Vir	IV
102	289		13 58 11	-12 52 35	13	17.55*	1.6'	0.6	Vir	III
103	327		14 11 54	-09 11 48	5	16.76*	1.1'	0.5	Vir	IV
104	328		14 20 28	-09 20 11	9	14.71*	1.6'	0.5	Vir	IV, IX
105	358		14 23 46	+06 35 05	7	16.1	2.6'	0.5	Vir	X
106	282		10 52 53	-11 00 28	8	18.21*	0.9'	0.6	Crt	II
107	285		11 19 06	-10 22 23	14	18.35*	2.4'	0.3	Crt	II
108	360	AGC 2113	15 41 27	+04 44 13	15	16.9	1.3'	1.2	Ser	X
109	330		15 14 20	-09 35 35	5	18.08*	0.9'	0.5	Lib	IV
110	213		13 45 12	+26 53 45	6	15.07*	1.9	0.4	Boo	VIII
111	376		13 56 35	+23 21 31	8	16.9	1.9'	0.5	Boo	X
112	10		14 10 49	+46 15 54	32	17.5	4'	1.8	Boo	V
113	11		14 11 08	+44 43 21	14	17.7	2.8'	0.4	Boo	V
114	15		14 20 56	+44 33 19	5	16.8	2.3"	0.6	Boo	V
115	74		14 21 08	+43 03 58	12	17.10*	4.2'	0.2	Boo	VI
116	14		14 25 21	+47 14 45	6	16.6	0.9'	0.9	Boo	V
117	359		14 29 56	+18 50 16	7	16.78	2	0.4	Boo	X
118	218		14 33 39	+26 41 03	15	17.3	3.1'	0.4	Boo	IX
119	257		14 46 55	+37 33 50	6	17.64	2.68	0.3	Boo	IX
120	219	PGC 53131 (AGC 1984)	14 52 36	+27 58 25	13	17.0	2.7'	0.4	Boo	IX
121	220		14 59 29	+29 42 27	7	17.15	2.7	0.2	Boo	IX
122	79		15 32 38	+43 03 56	12	17.5	1.0'	0.9	Boo	VI
123	258		15 23 40	+32 24 00	10	17.11*	2.22'	0.3	CrB	IX
124	223		15 49 43	+29 09 38	14	15.8*	4'	0.4	CrB	IX
125	131		14 38 09	+62 44 10	6	16.7	1.9'	0.4	Dra	VII
126	22		15 45 49	+55 06 33	5	16.7	2.4'	0.7	Dra	V
127	20		15 46 44	+55 00 49	14	17.0	2.5'	0.9	Dra	V
128	8		16 03 41	+52 21 09	7	17.5	0.6'	0.9	Dra	V
129	135		16 13 35	+64 21 34	11	16.8	2.4'	0.3	Dra	VII
130	4		16 19 53	+61 43 12	7	17.04*	0.9'	0.9	Dra	V
131	13		16 45 19	+53 42 41	11	16.5	1.7'	0.4	Dra	V
132	16	Arp 330	16 49 11	+53 25 12	15	15.34*	5'	0.6	Dra	V
133	296	AGC 2362	21 40 35	-14 18 21	16	17.81*	3.4'	0.4	Cap	III
134	81		21 57 59	-01 44 39	11	17.75*	1.3'	0.8	Aqr	I
135	331		22 25 27	-02 47 25	7	16.06*	1.1'	0.6	Aqr	IV
136	302		23 17 19	-11 42 36	8	17.34*	2.2'	0.4	Aqr	III
137	304		23 43 40	-12 28 21	8	16.97*	2.6'	0.3	Aqr	III

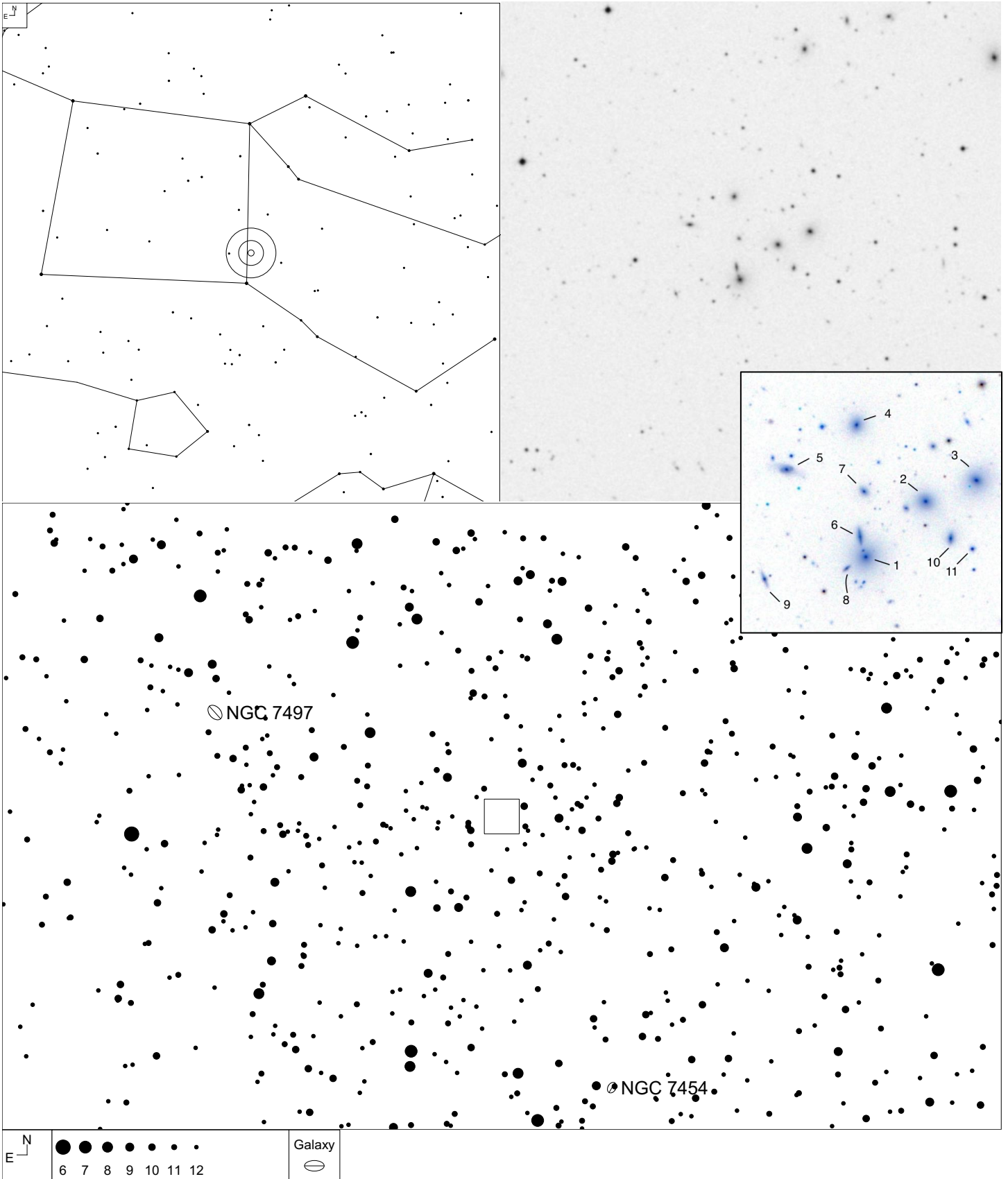
Magnitudes with * are from D. Stoll's Photometric journal articles, otherwise from SDSS or NED.

Paper corresponds to the Photometric or Catalogue journal article by D. Stoll, et al. "R&W" = Robinson and Wampler journal article, see Additional Resources for bibliographic details.

For the full list of 377 Shakhbazian Compact Galaxy Groups of Galaxies, see heasarc.gsfc.nasa.gov/W3Browse/all/shk.html

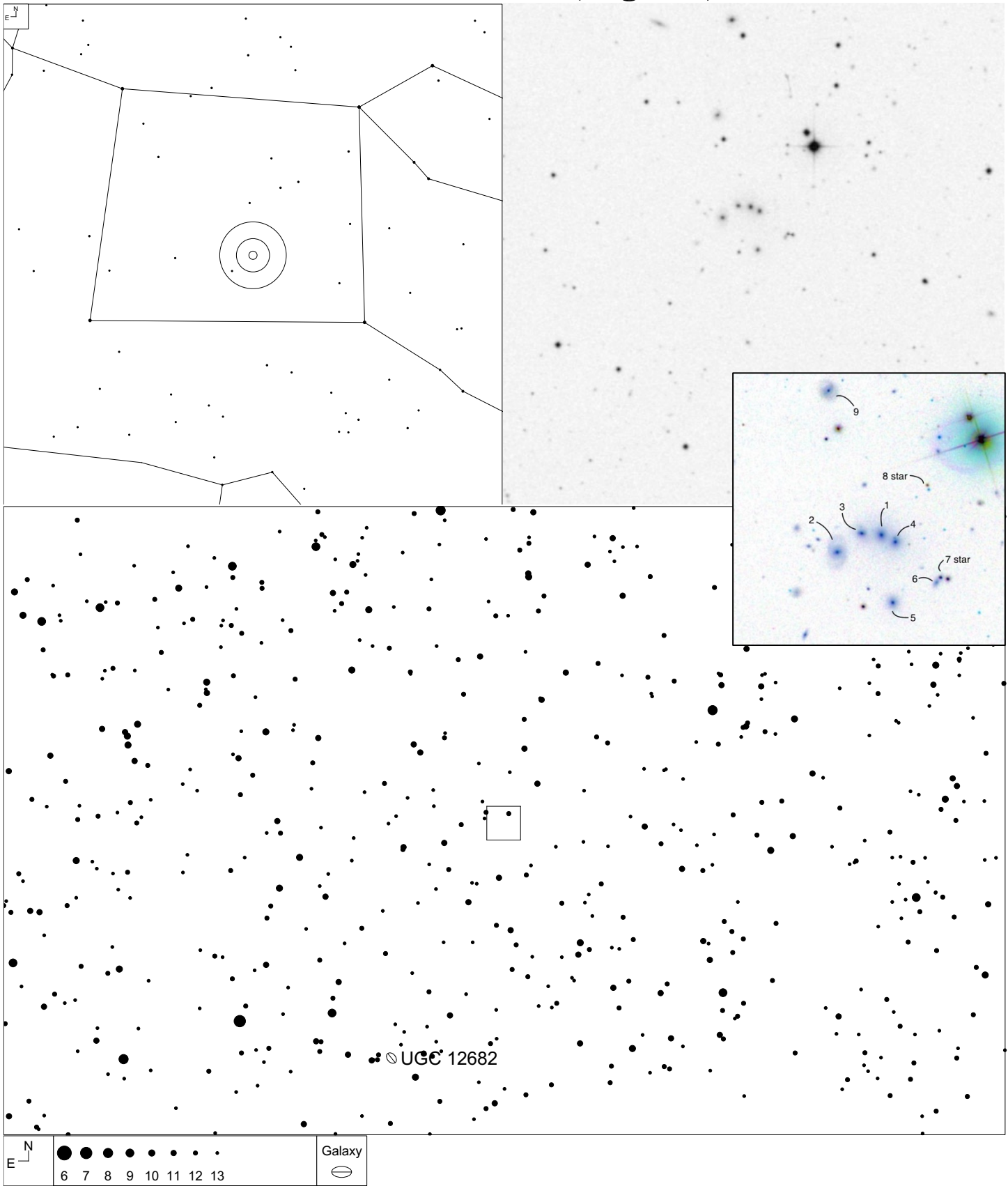
Atlas of the Selected Shakhbazian Compact Galaxy Groups

Shakhbazian 361 (Pegasus)



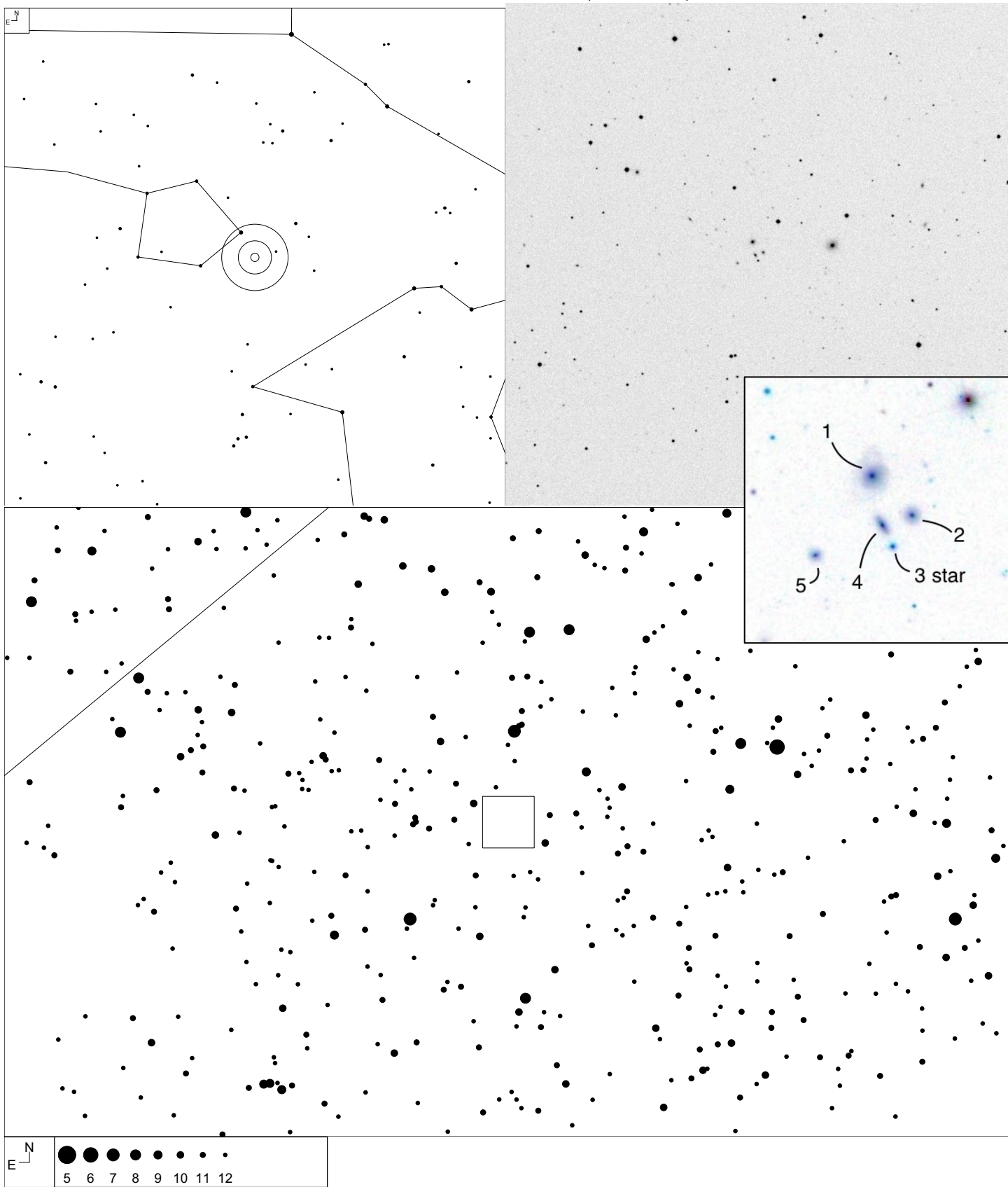
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 2524	23 03 18	+17 41 13	11	15.9	2.8'	0.5

Shakhbazian 362 (Pegasus)



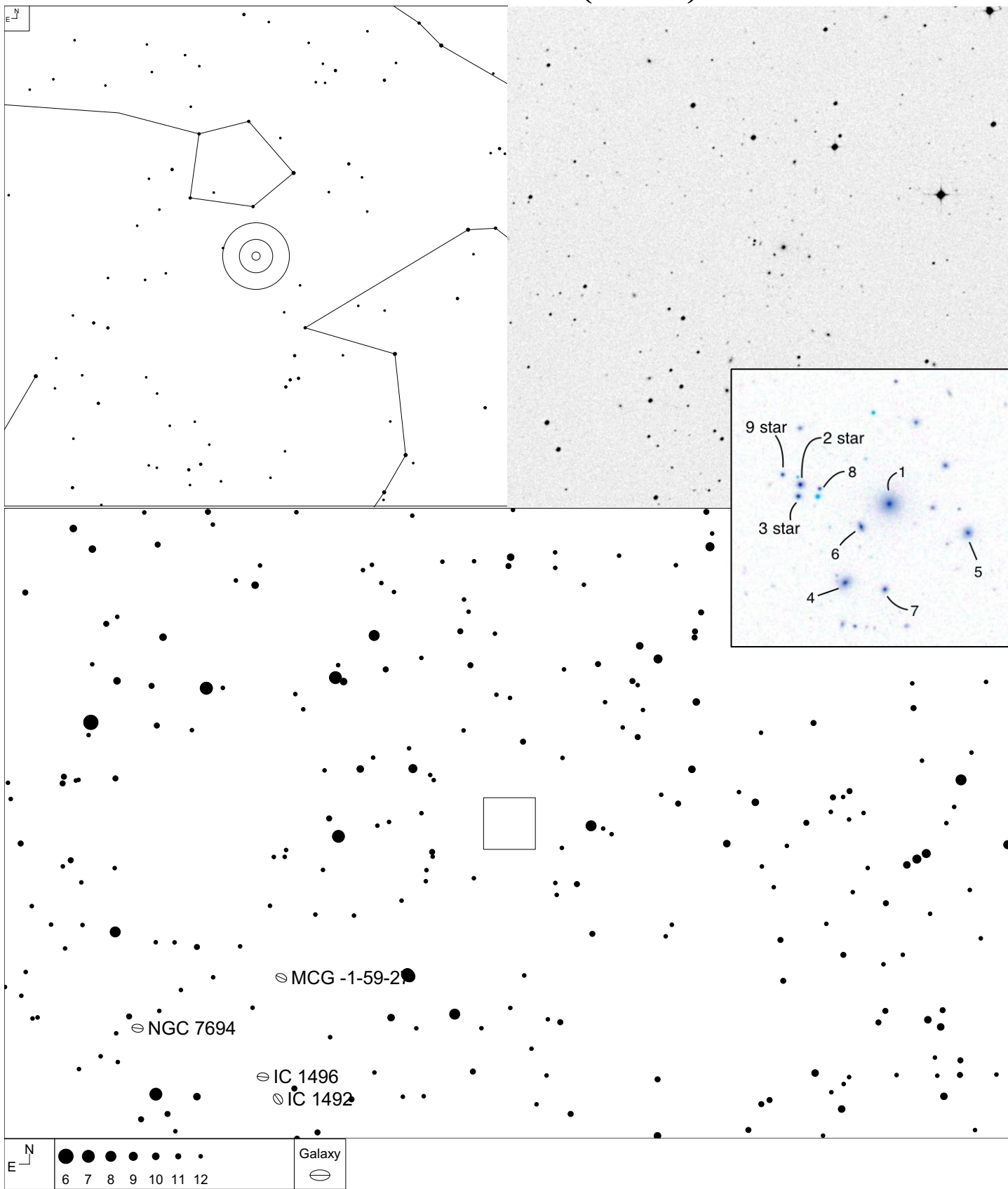
Object	RA	Dec	#	Mag	Size	Cmpt
III Zw 108	23 32 37	+19 21 34	9	16.6	0.9'	1.2

Shakhbazian 82 (Pisces)



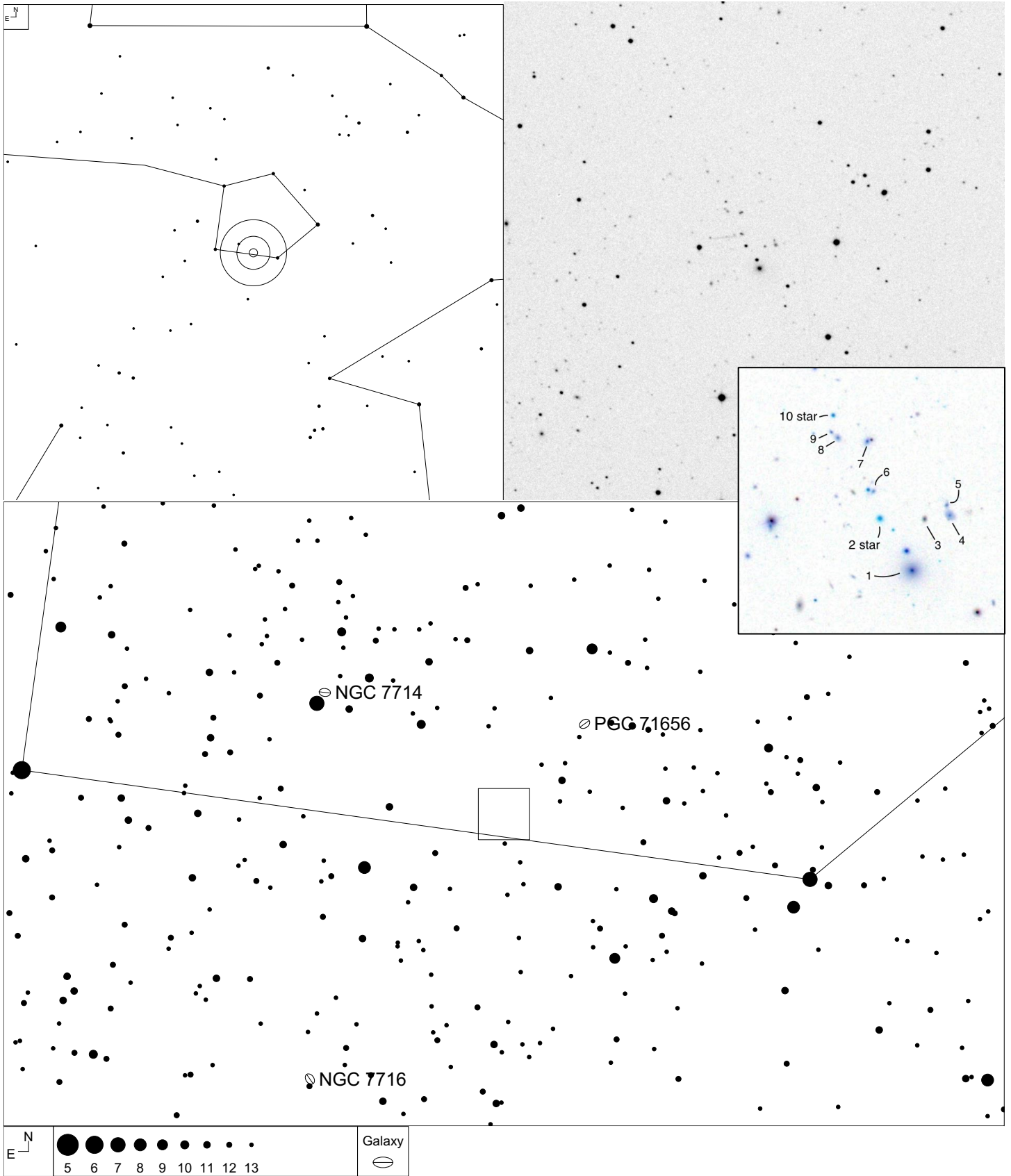
Object	RA	Dec	#	Mag	Size	Cmpt
	23 13 42	+01 46 12	5	17.66*	0.9'	0.7

Shakhbazian 83 (Pisces)



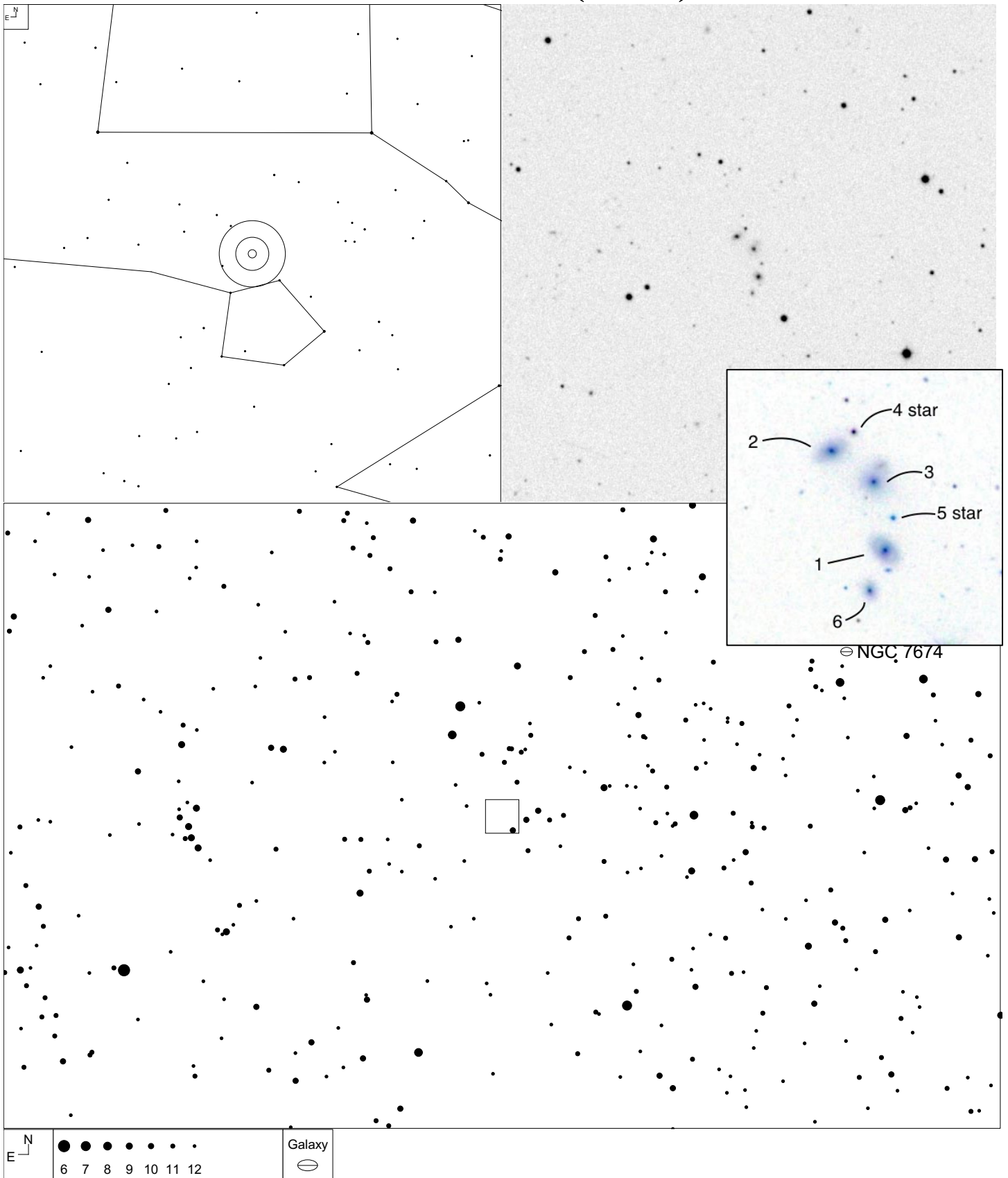
Object	RA	Dec	#	Mag	Size	Cmpt
	23 26 12	-01 43 48	9	18.02*	1.9'	0.4

Shakhbazian 27 (Pisces)



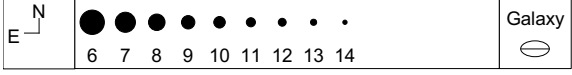
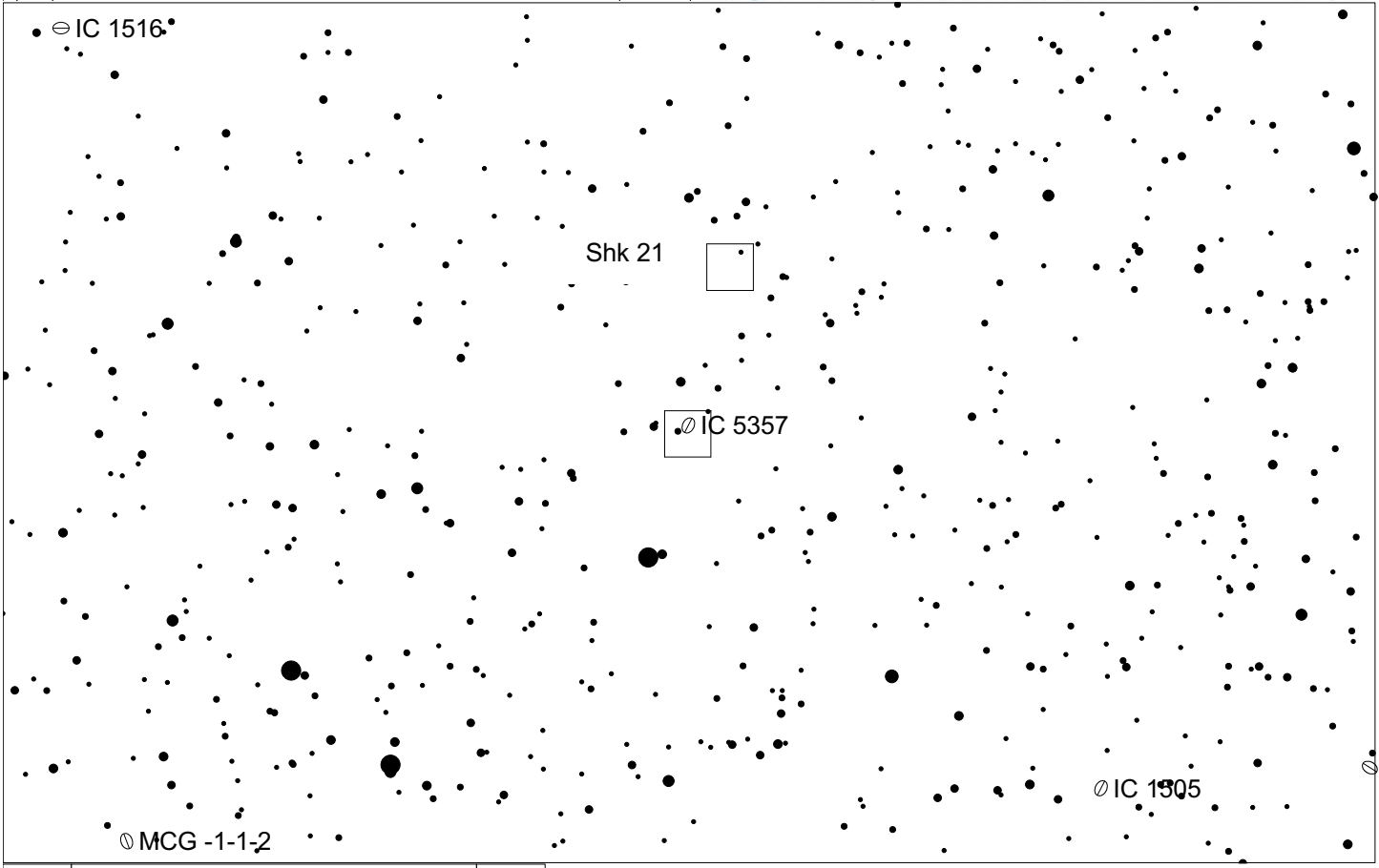
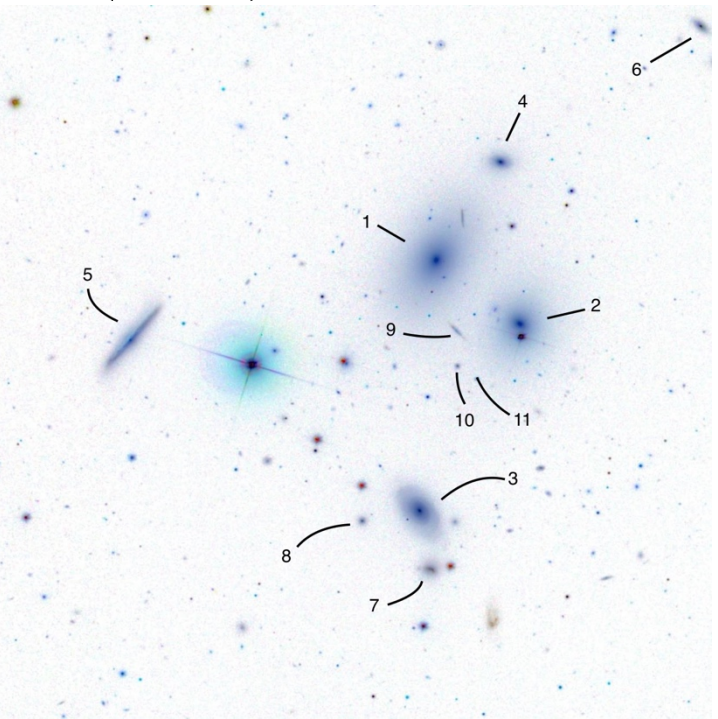
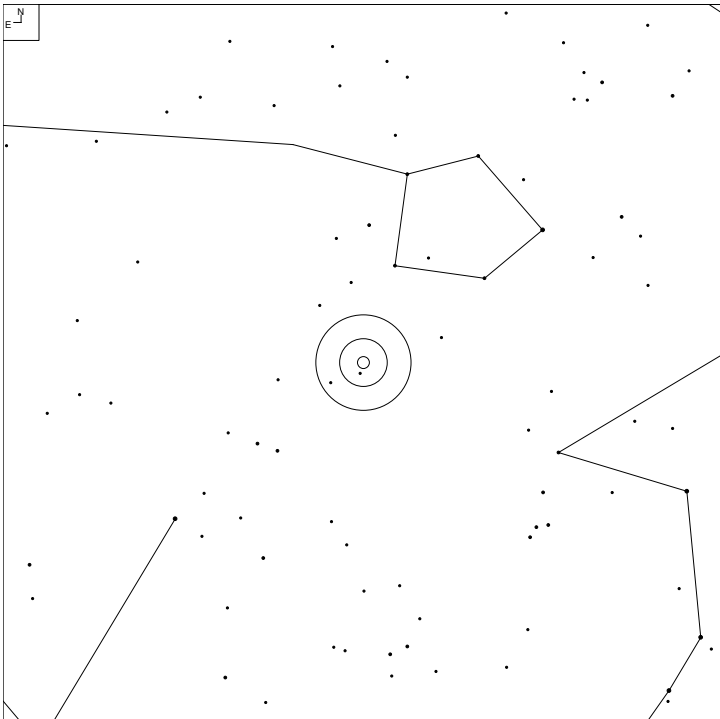
Object	RA	Dec	#	Mag	Size	Cmpt
	23 32 43	+01 33 15	10	17.45*	3'	0.4

Shakhbazian 84 (Pisces)



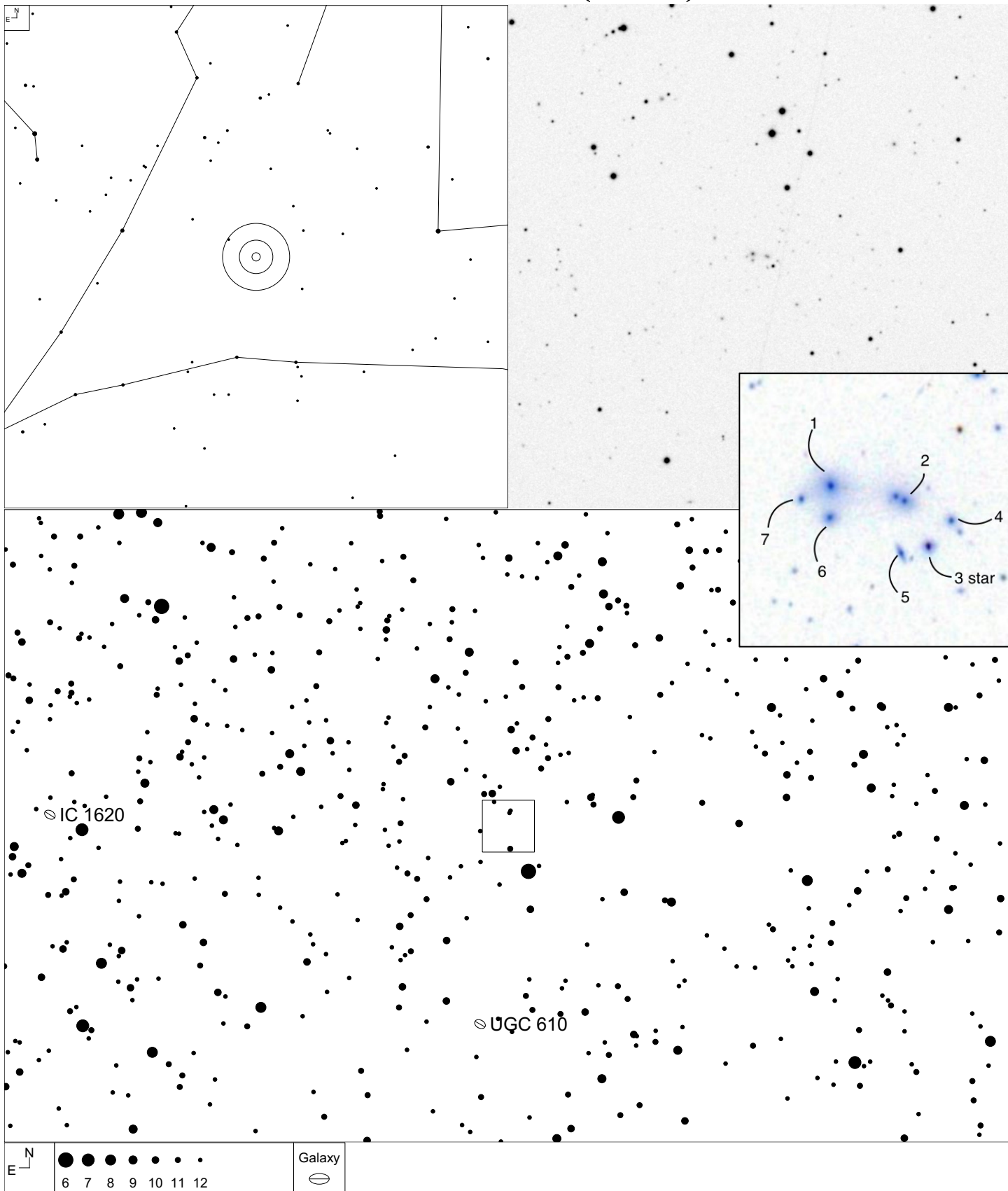
Object	RA	Dec	#	Mag	Size	Cmpt
	23 34 38	+07 59 35	6	17.2	1.3'	0.4

Shakhbazian 30 (Pisces)



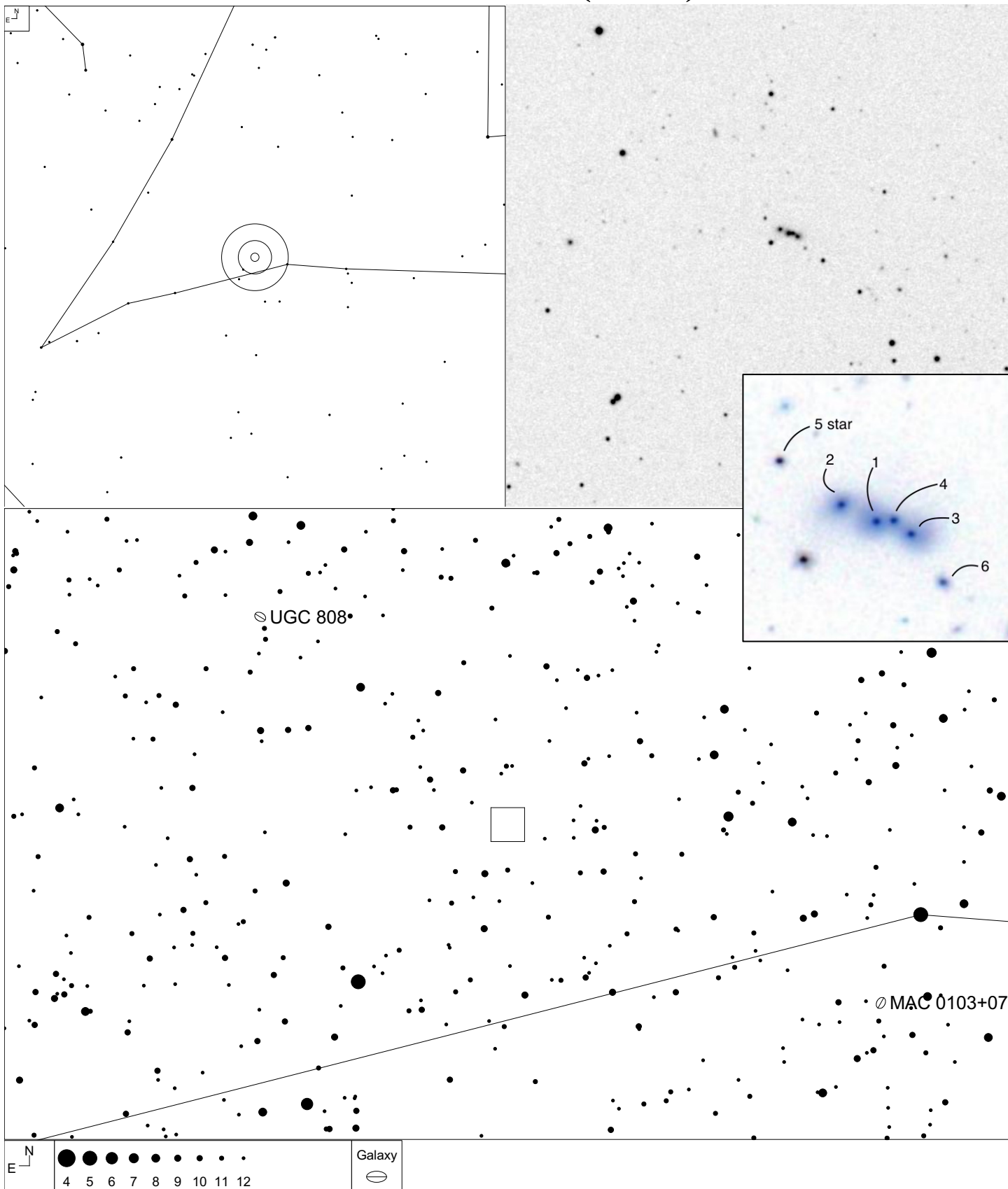
Object	RA	Dec	#	Mag	Size	Cmpt
Hickson 97	23 47 23	-02 18 03	11	13.88*	4.5'	0.5

Shakhbazian 31 (Pisces)



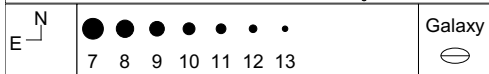
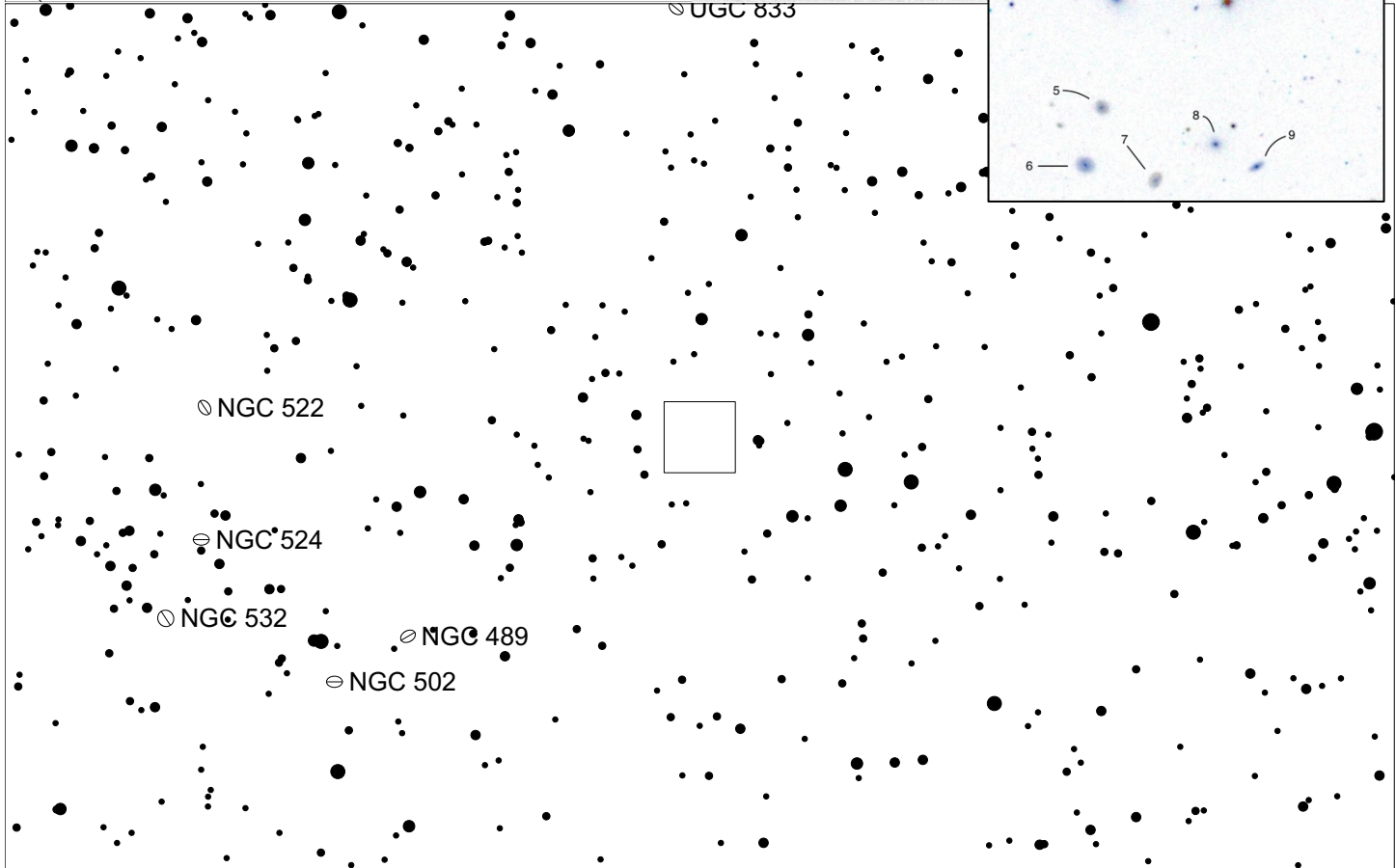
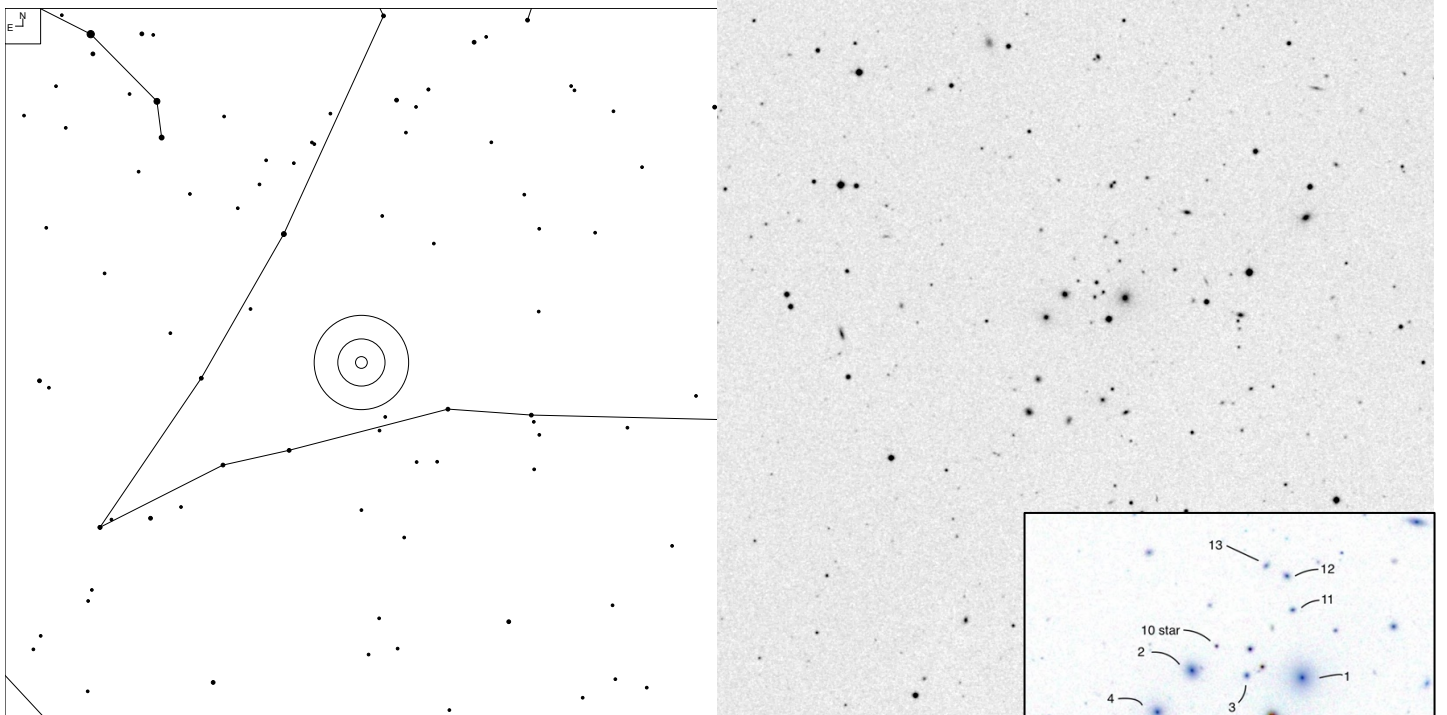
Object	RA	Dec	#	Mag	Size	Cmpt
	00 58 18	+13 54 39	7	17.6	1'	0.6

Shakhbazian 38 (Pisces)



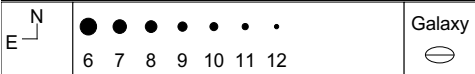
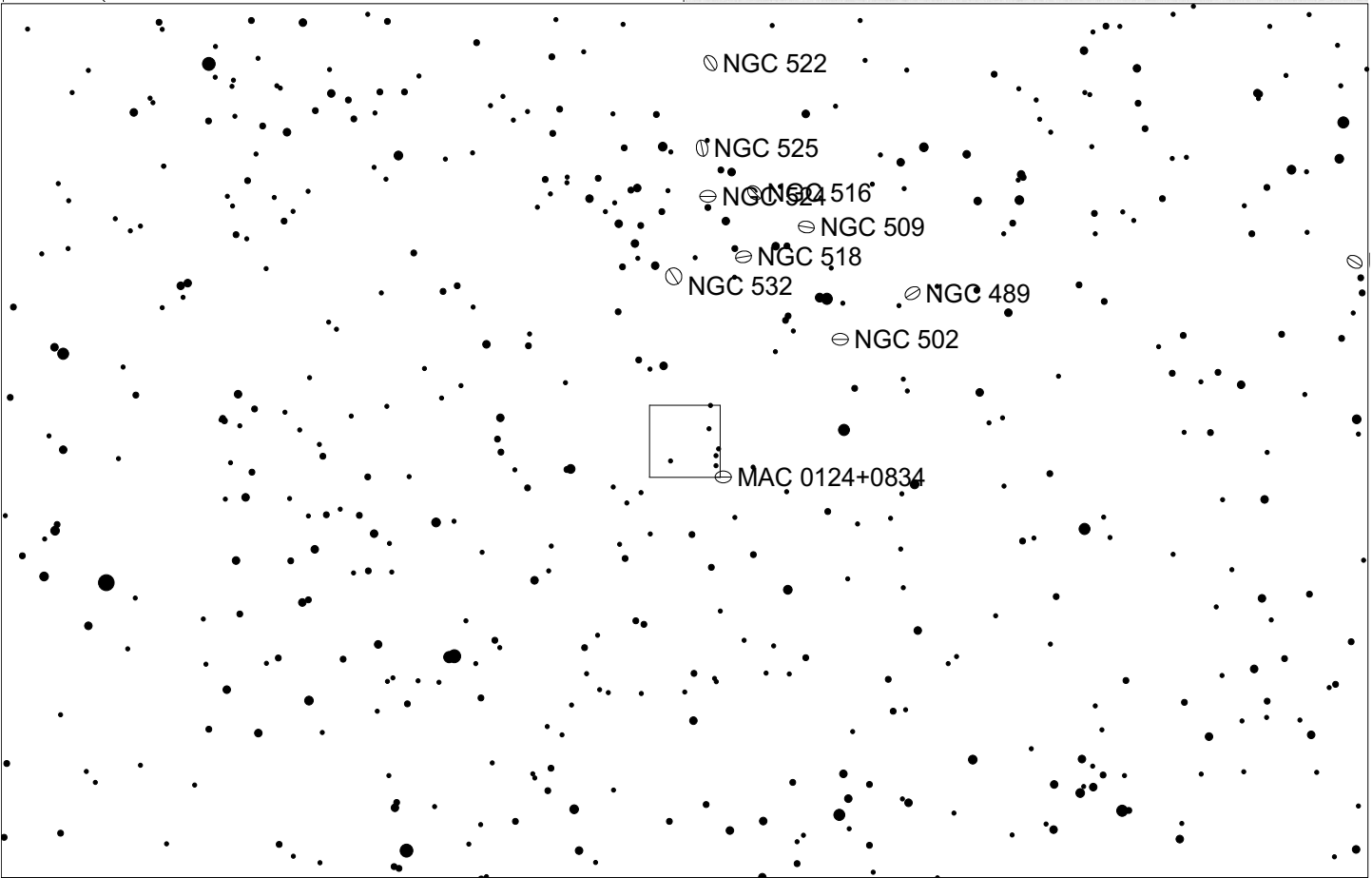
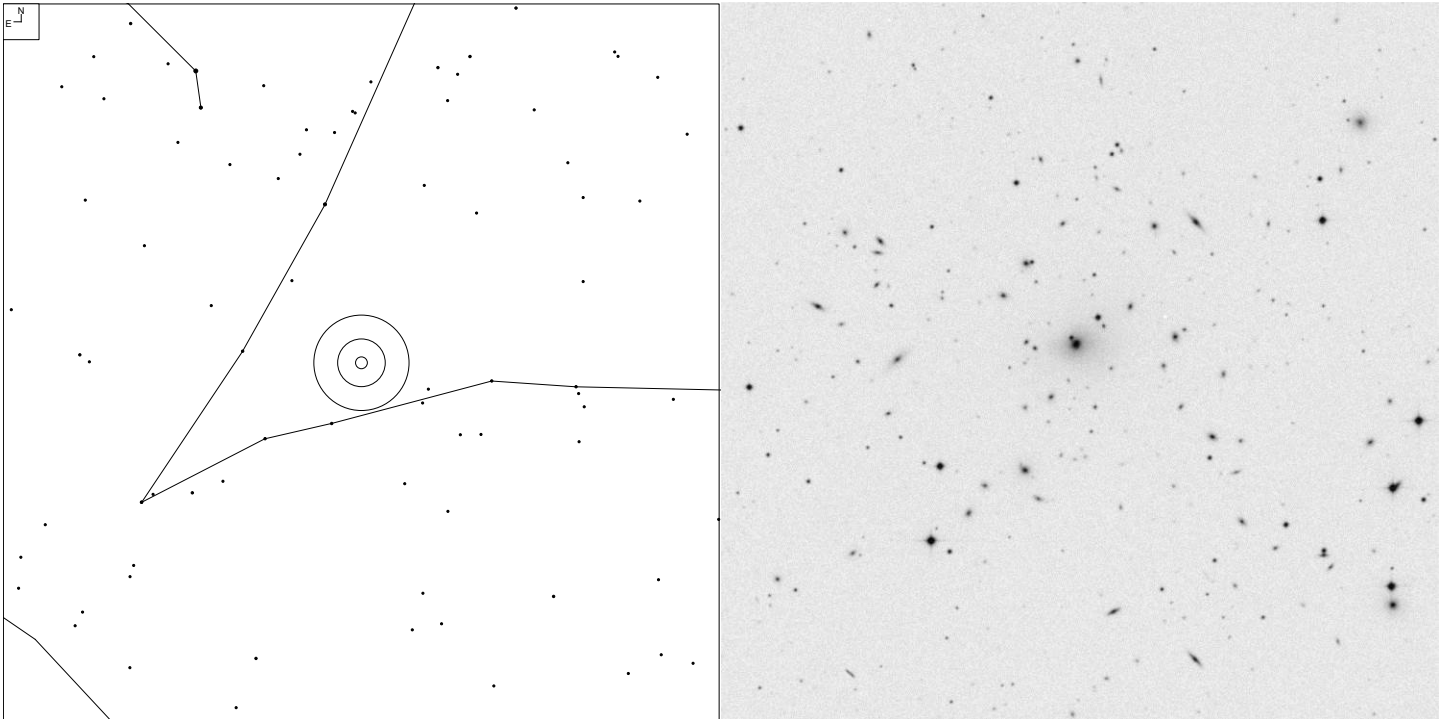
Object	RA	Dec	#	Mag	Size	Cmpt
PGC 4212	01 10 52	+08 19 21	6	17.1	1.1'	0.4

Shakhbazian 39 (Pisces)



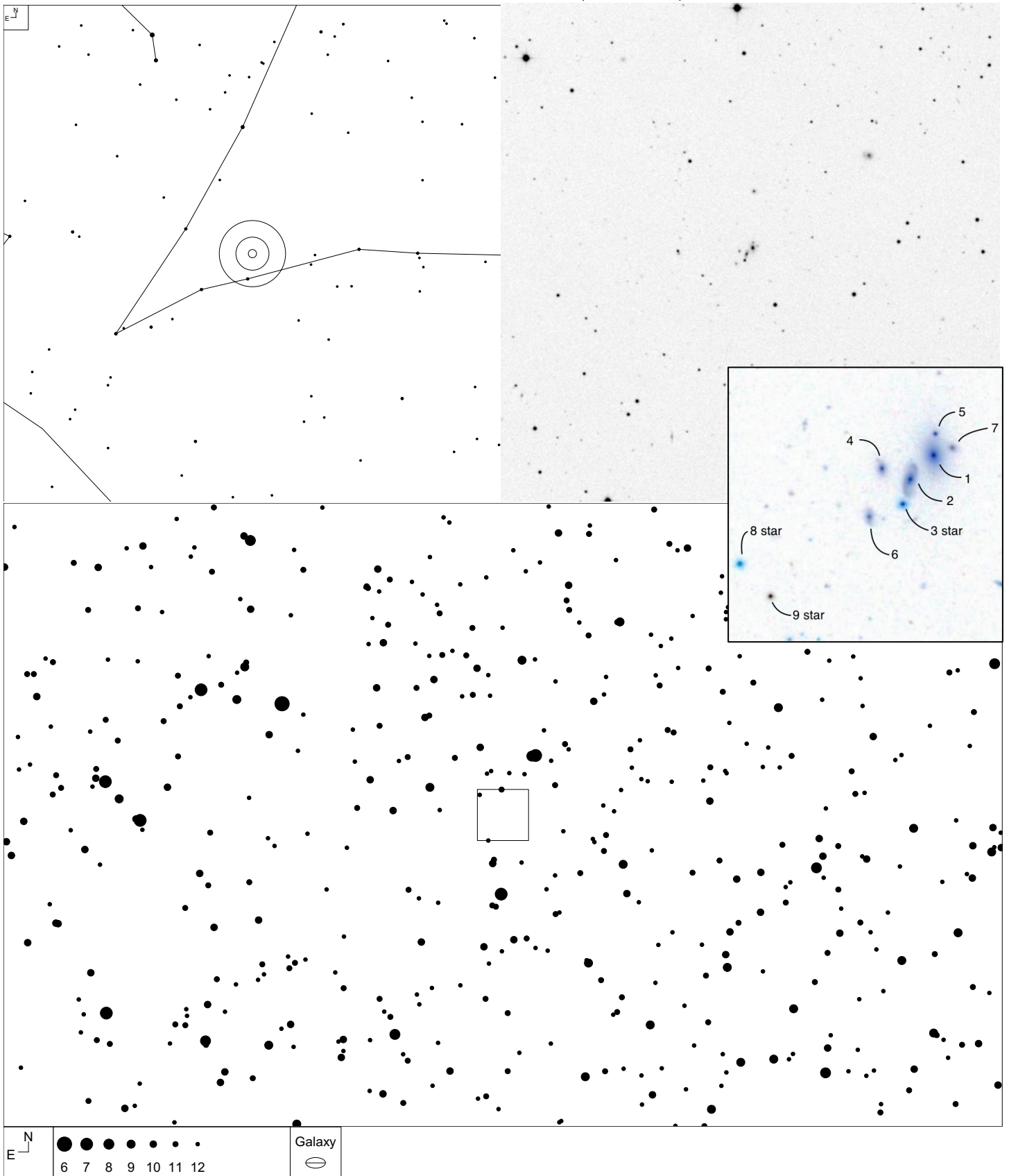
Object	RA	Dec	#	Mag	Size	Cmpt
	01 17 48	+09 51 49	13	16.8	3.3'	0.4

Shakhbazian 40 (Pisces)



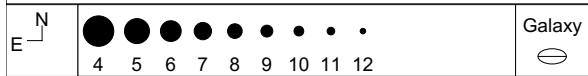
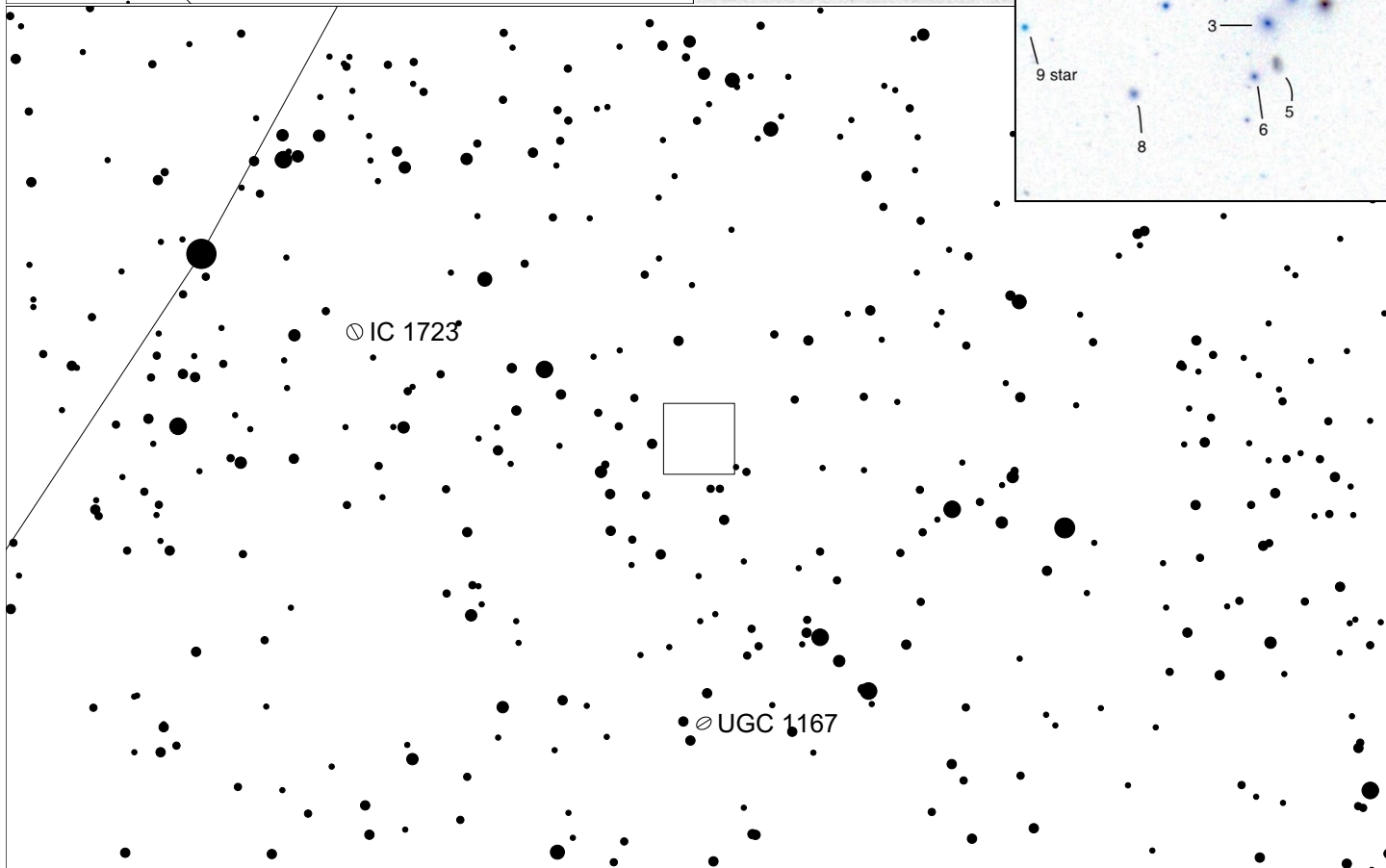
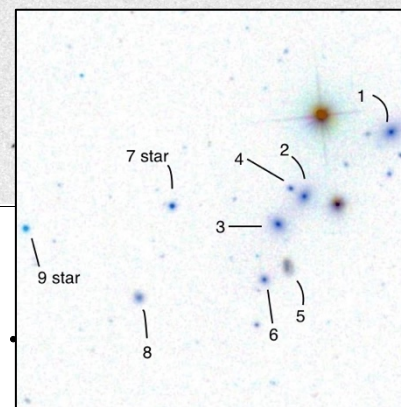
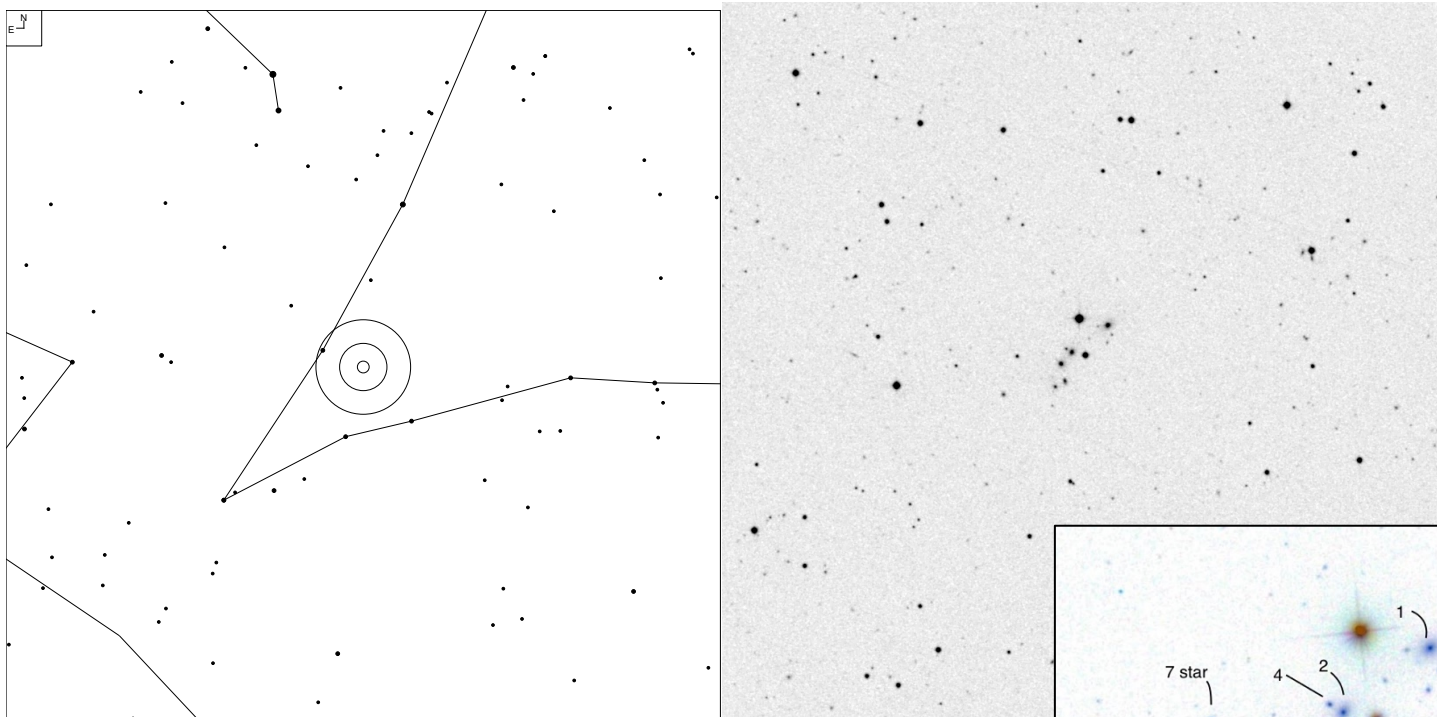
Object	RA	Dec	#	Mag	Size	Cmpt
IC 1695 (AGC 193)	01 25 07	+08 41 59	60	14.9	15'	0.4

Shakhbazian 41 (Pisces)



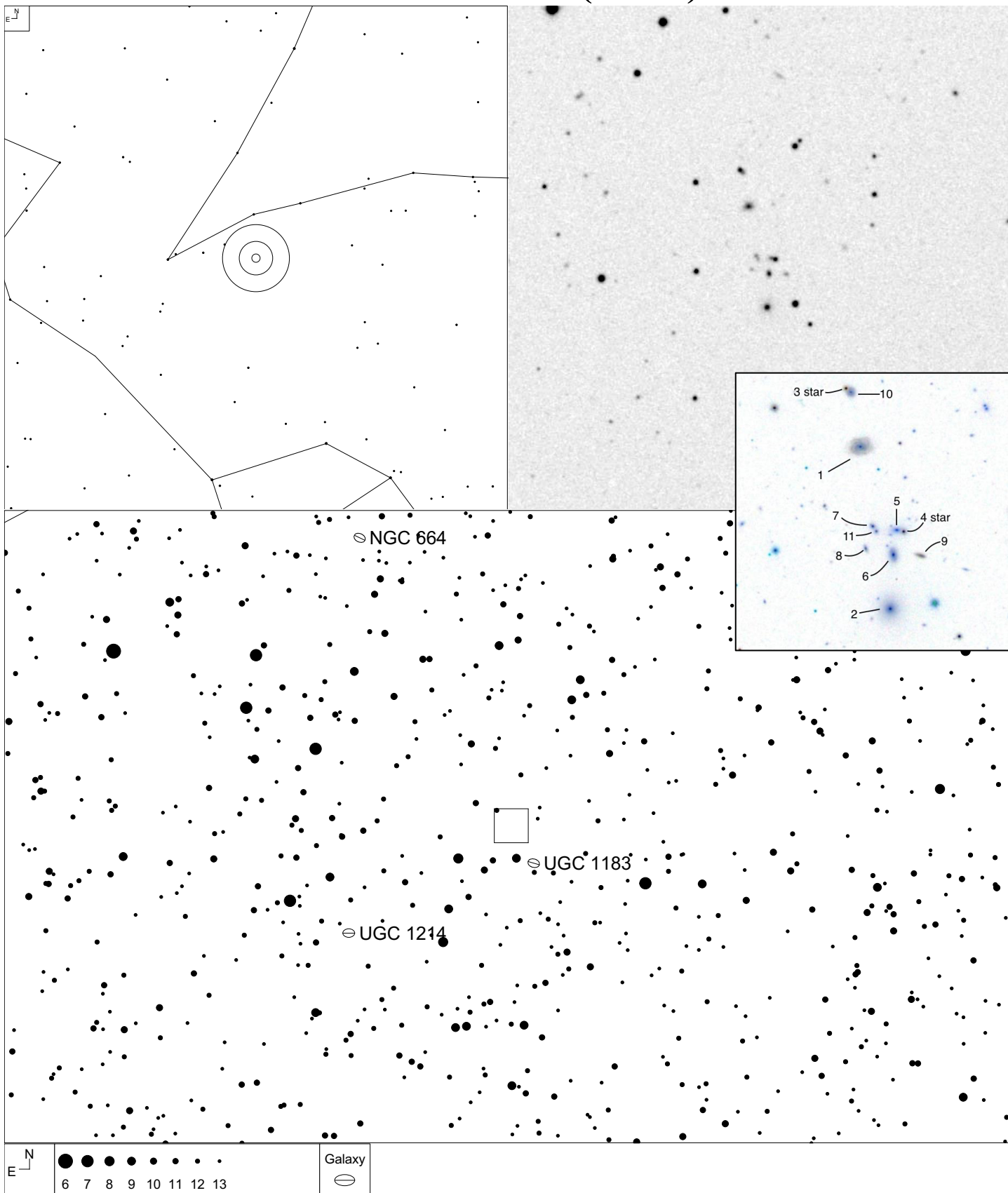
Object	RA	Dec	#	Mag	Size	Cmpt
	01 29 01	+07 40 30	9	15.6*	0.9'	0.8

Shakhbazian 43 (Pisces)



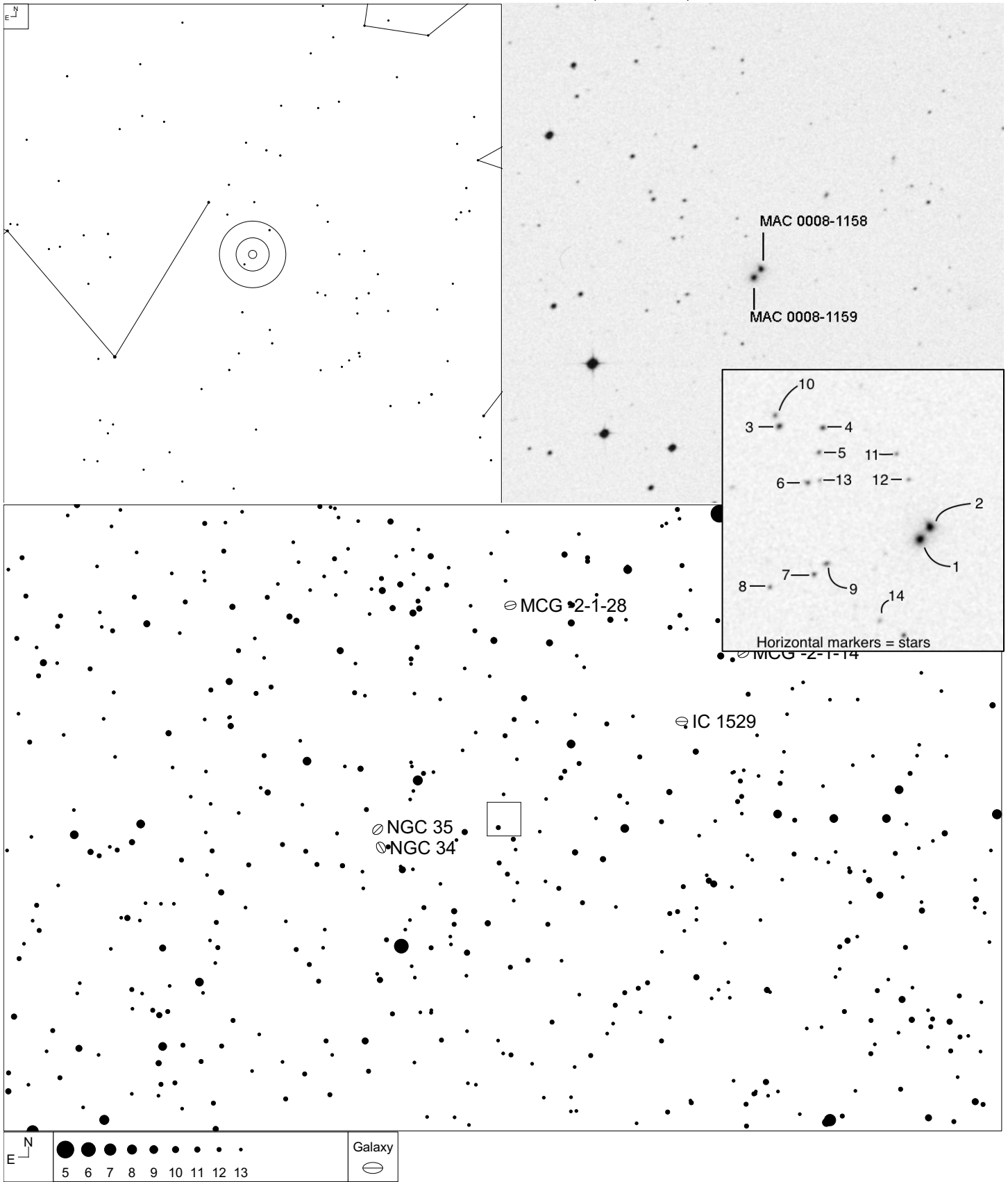
Object	RA	Dec	#	Mag	Size	Cmpt
	01 38 25	+08 31 12	9	16.5	3.5'	0.4

Shakhbazian 44 (Pisces)



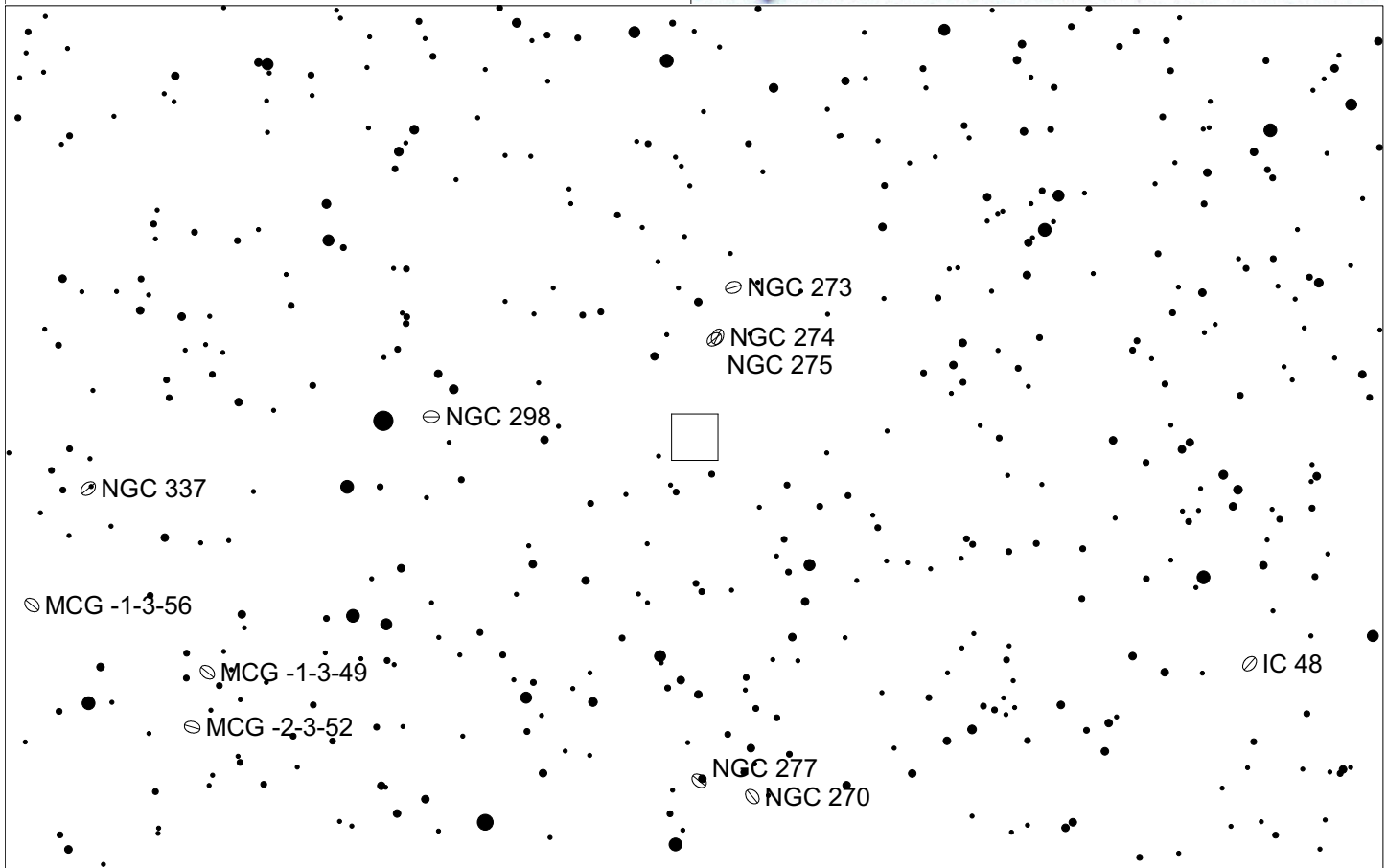
Object	RA	Dec	#	Mag	Size	Cmpt
	01 40 53	+02 51 01	11	16.7	2.8'	0.4

Shakhbazian 262 (Cetus)



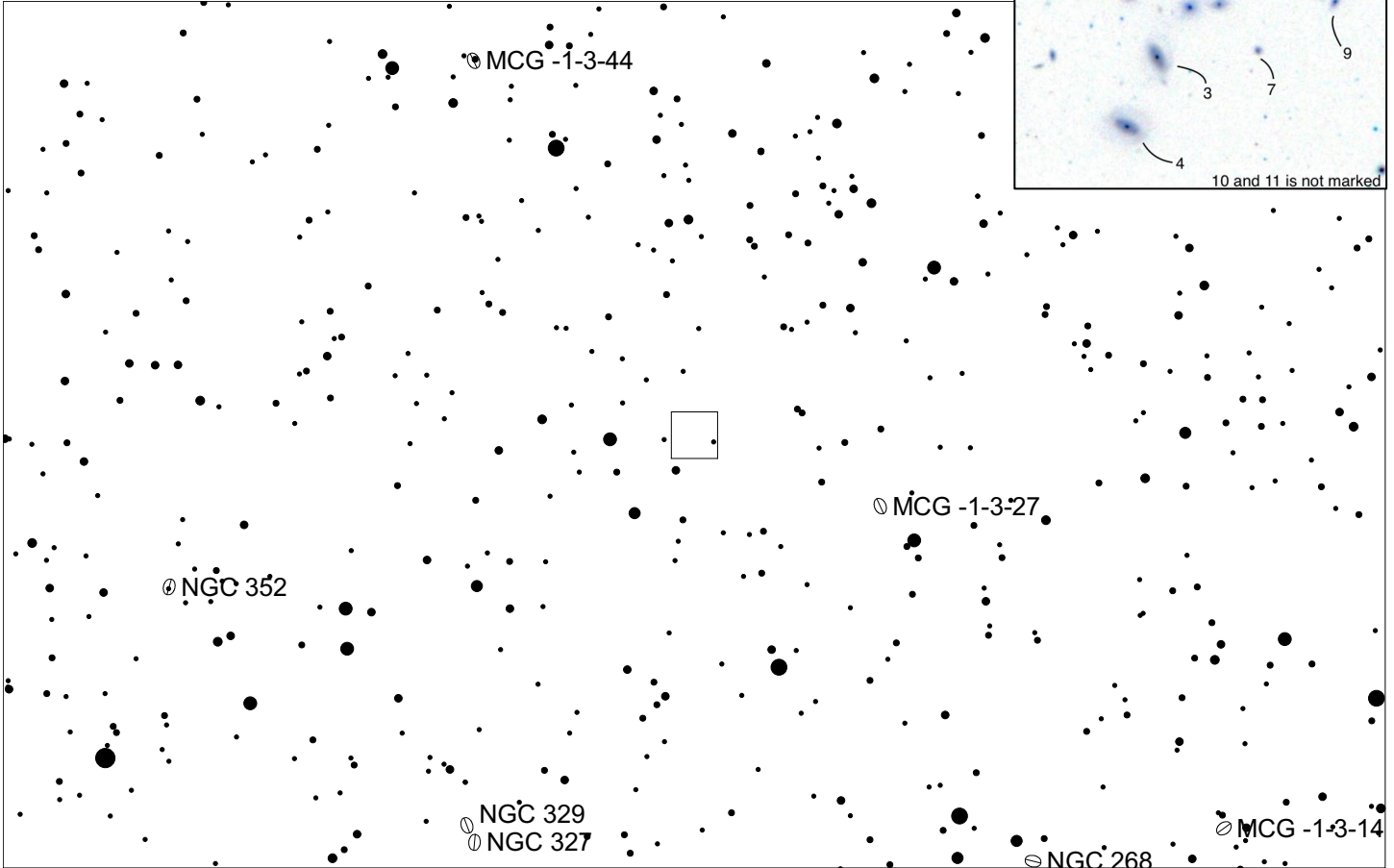
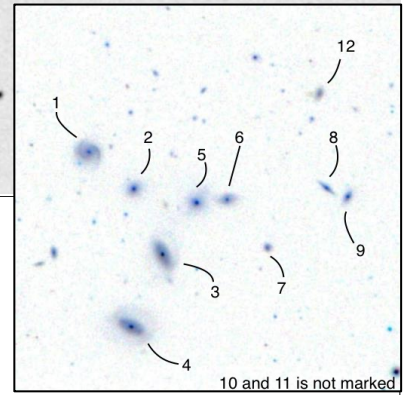
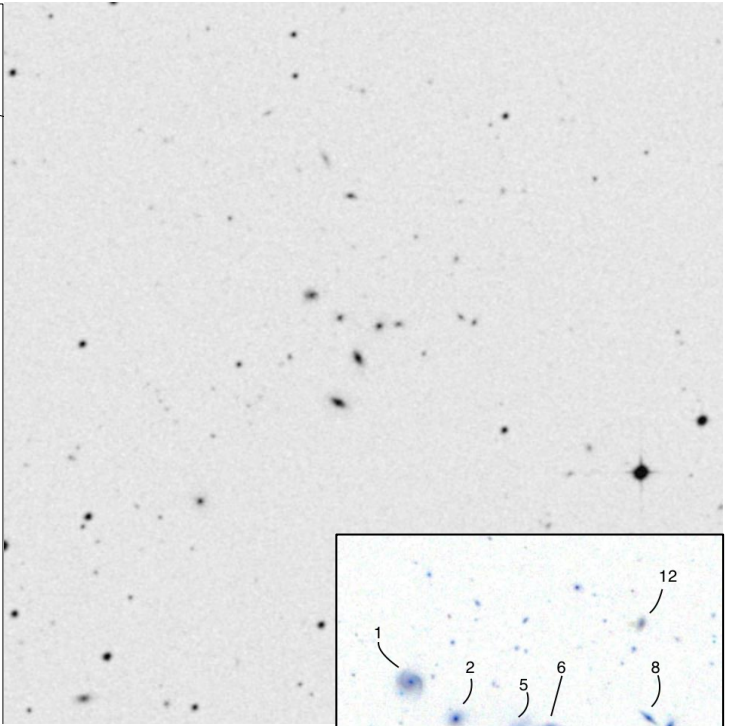
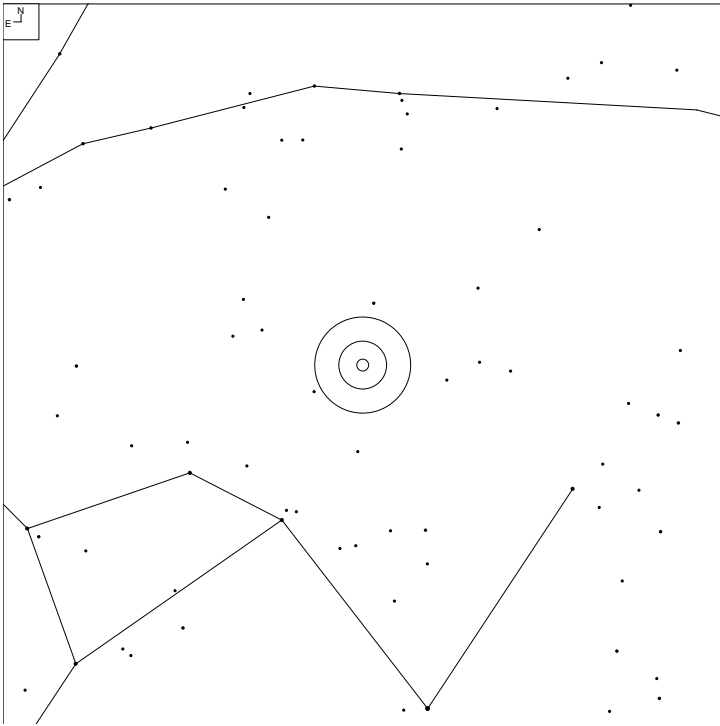
Object	RA	Dec	#	Mag	Size	Cmpt
	00 08 42	-11 58 18	14	17.10*	3.4'	0.4

Shakhbazian 309 (Cetus)



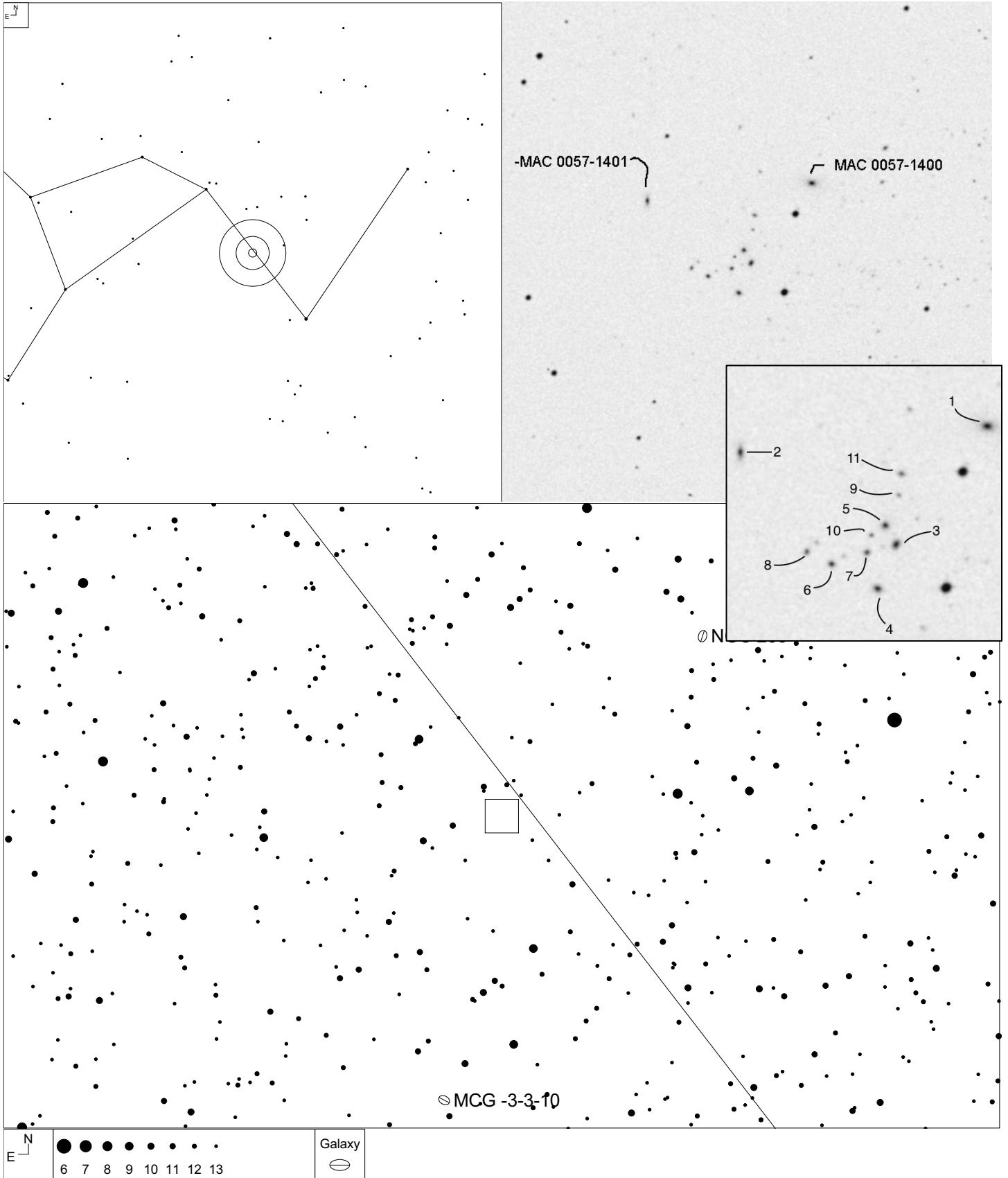
Object	RA	Dec	#	Mag	Size	Cmpt
	00 51 21	-07 24 17	14	17.49*	6.7'	0.2

Shakhbazian 310 (Cetus)

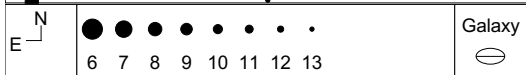


Object	RA	Dec	#	Mag	Size	Cmpt
	00 54 52	-03 43 22	10	17.05*	2.2'	0.6

Shakhbazian 265 (Cetus)

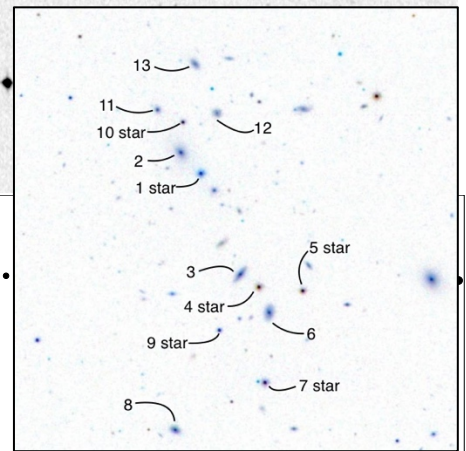
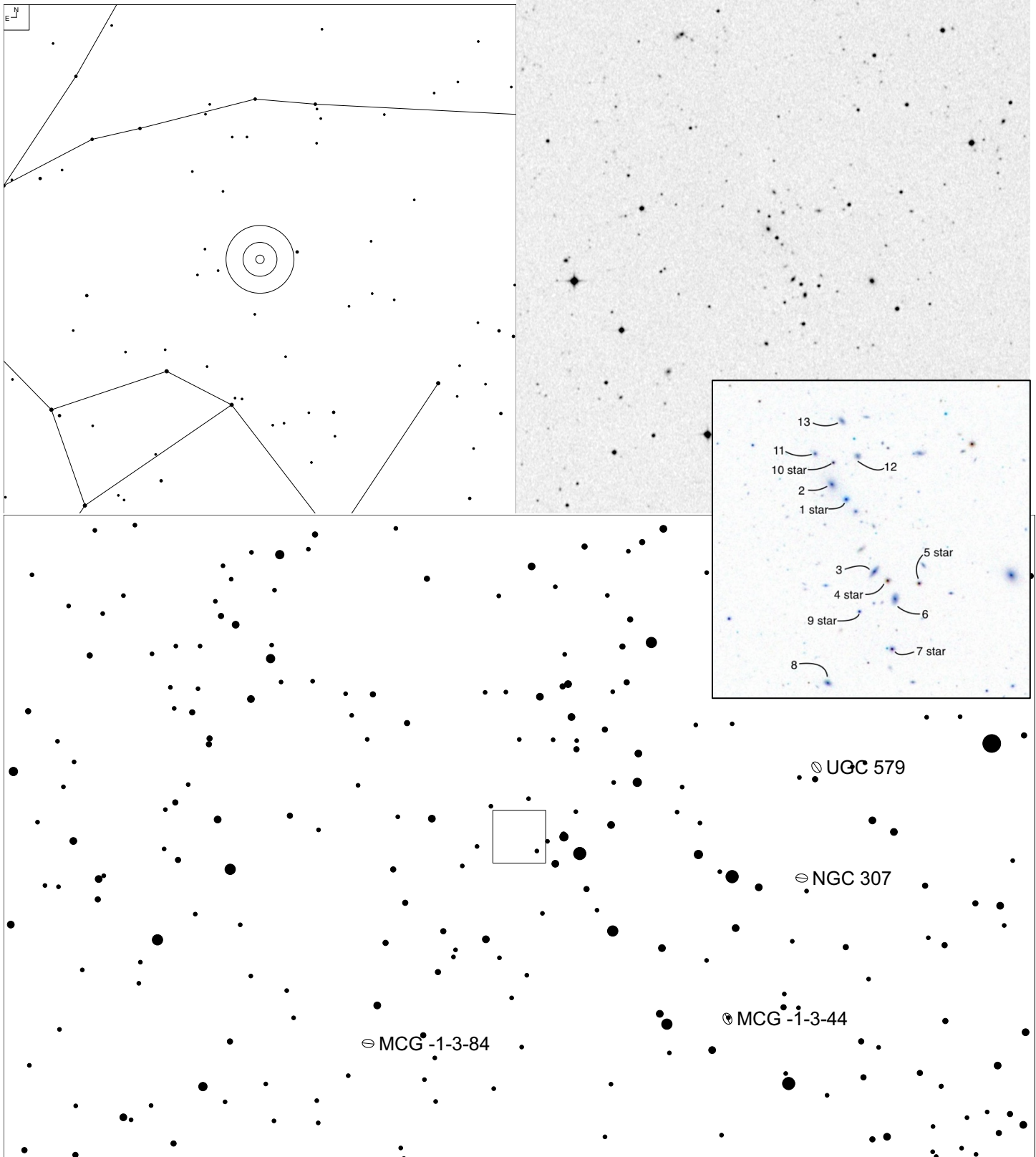


☉ MCG -3-3-10



Object	RA	Dec	#	Mag	Size	Cmpt
	00 57 11	-14 01 47	11	17.41*	3'	0.4

Shakhbazian 32 (Cetus)

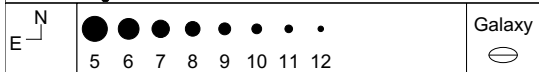


☉ UGC 579

☉ NGC 307

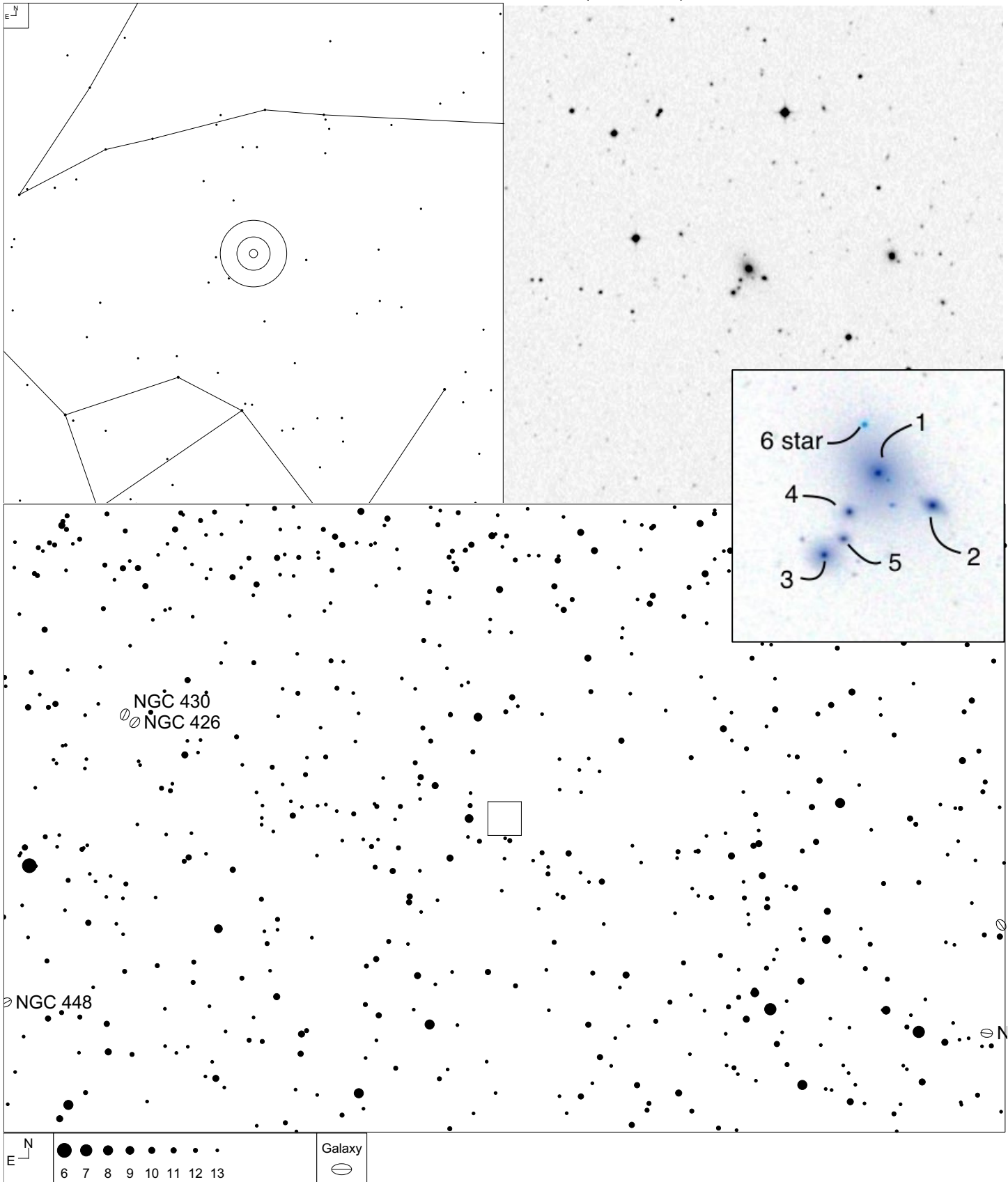
☉ MCG -1-3-44

☉ MCG -1-3-84



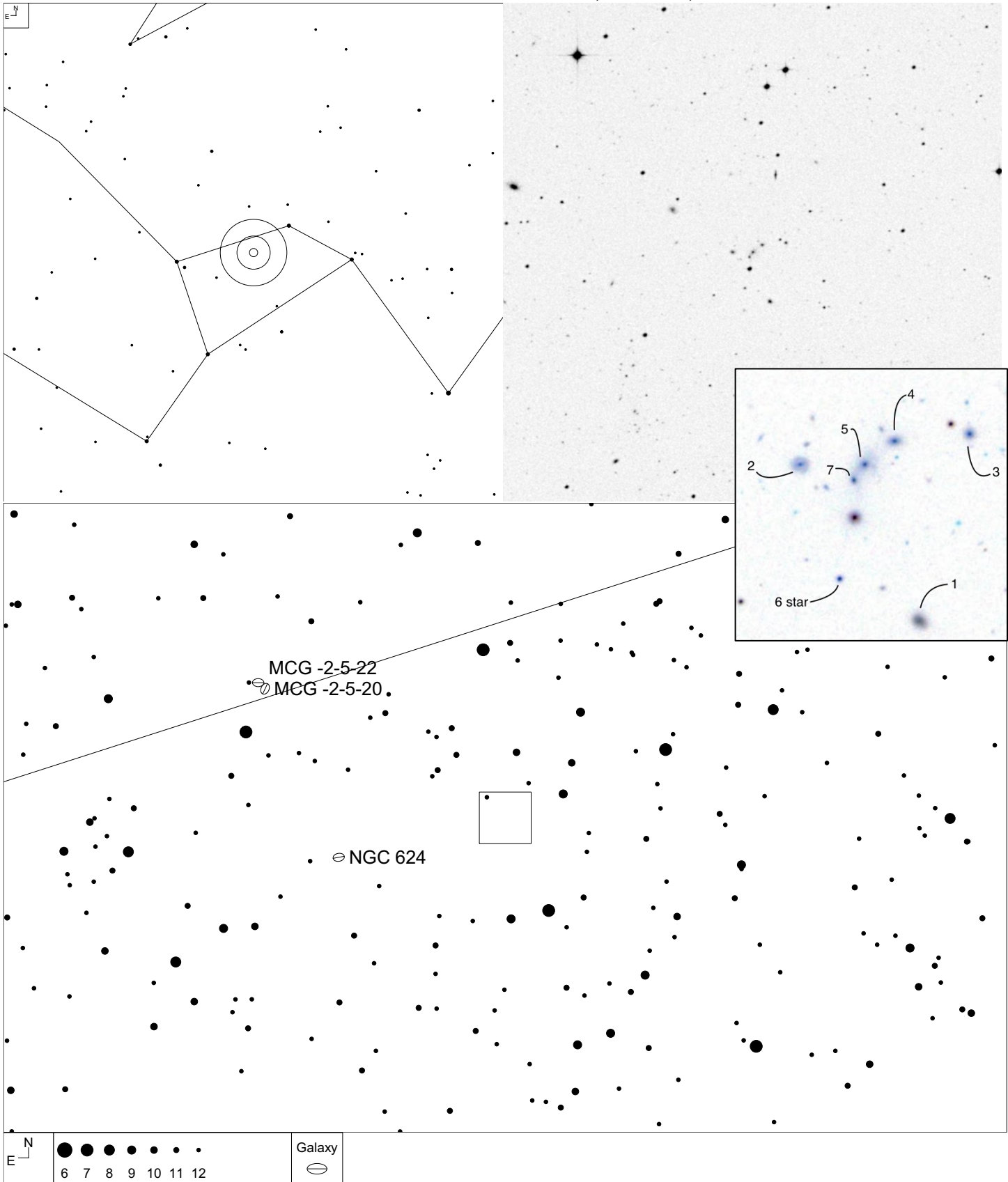
Object	RA	Dec	#	Mag	Size	Cmpt
	01 01 48	-01 34 48	13	18.54*	3.3'	0.4

Shakhbazian 35 (Cetus)



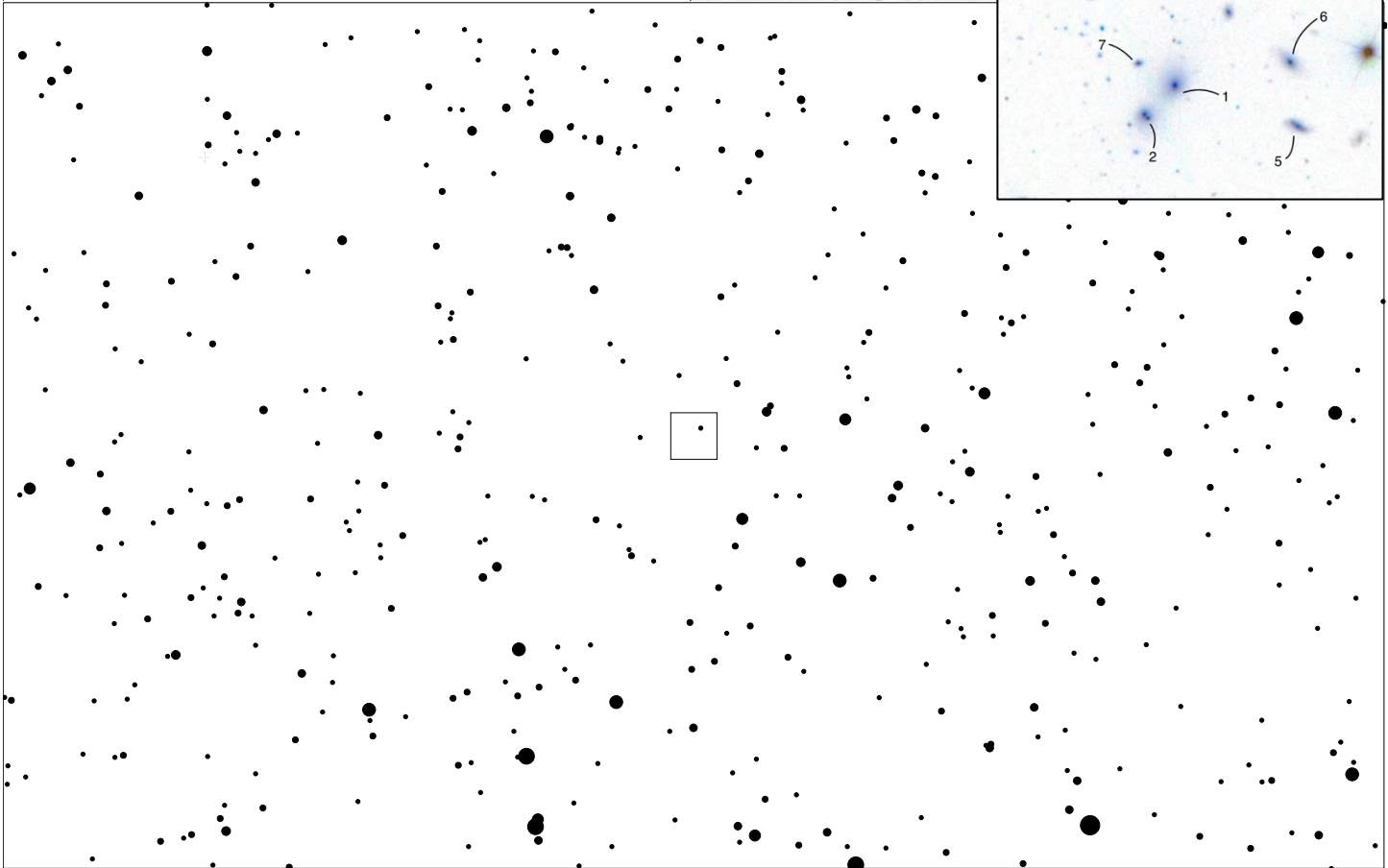
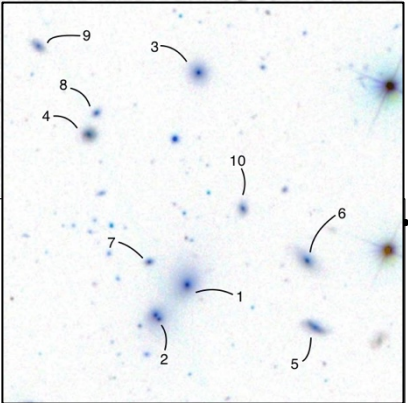
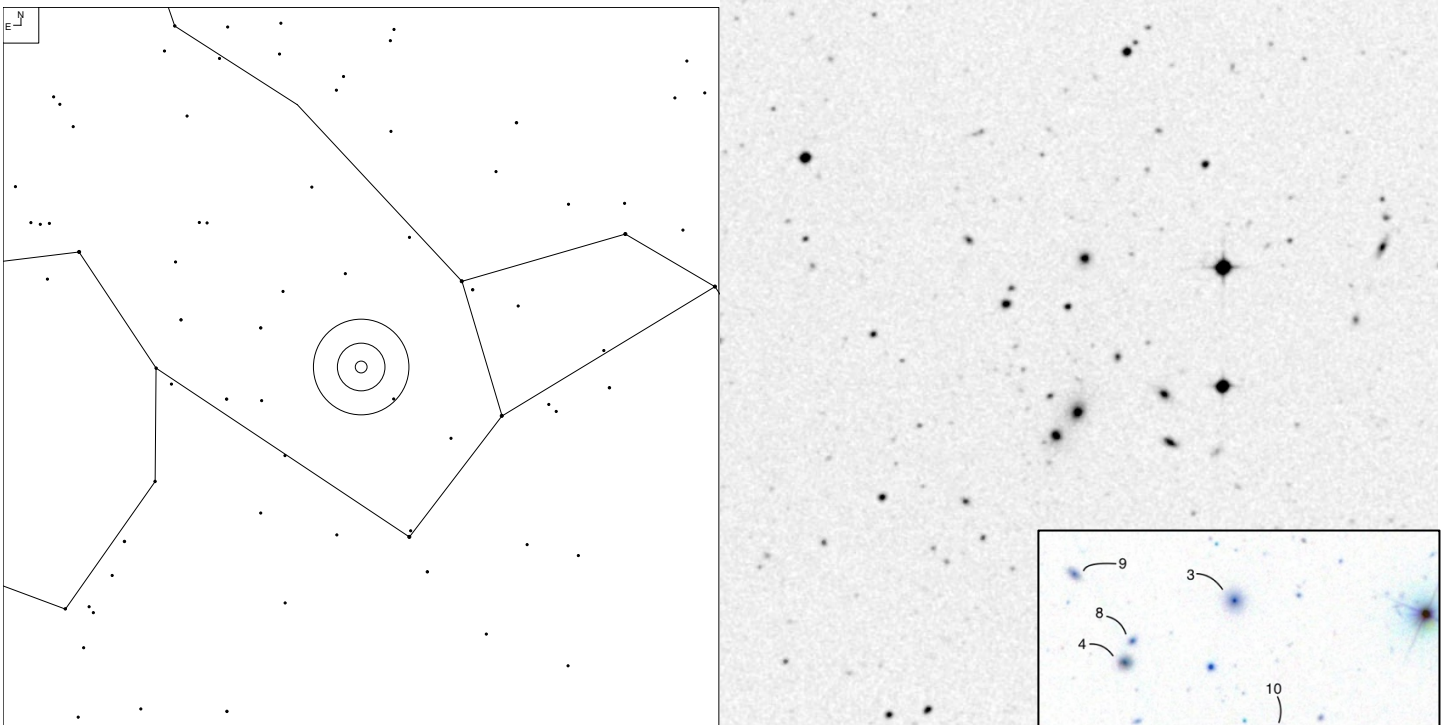
Object	RA	Dec	#	Mag	Size	Cmpt
	01 05 45	-00 44 57	6	16.58*	0.8'	0.9

Shakhbazian 266 (Cetus)



Object	RA	Dec	#	Mag	Size	Cmpt
	01 32 38	-09 48 56	7	17.81*	2.7	0.3

Shakhbazian 270 (Cetus)

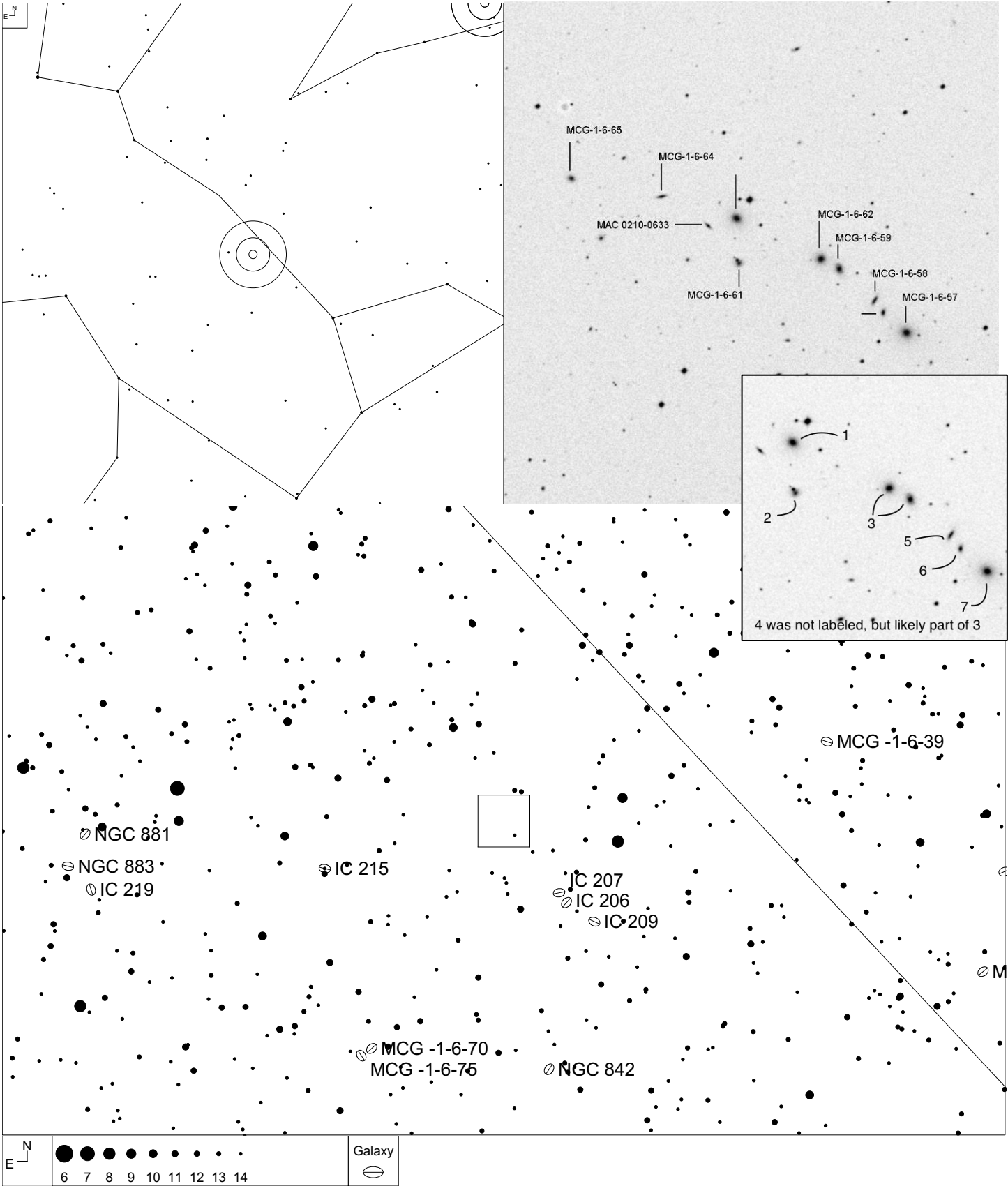


6 7 8 9 10 11 12 13

Galaxy Radio

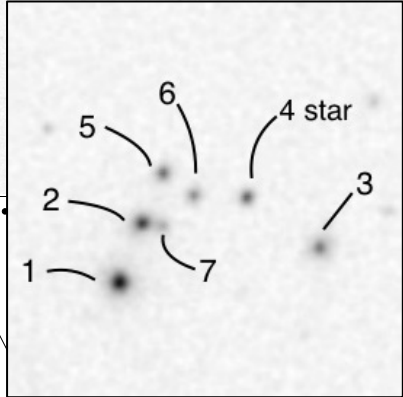
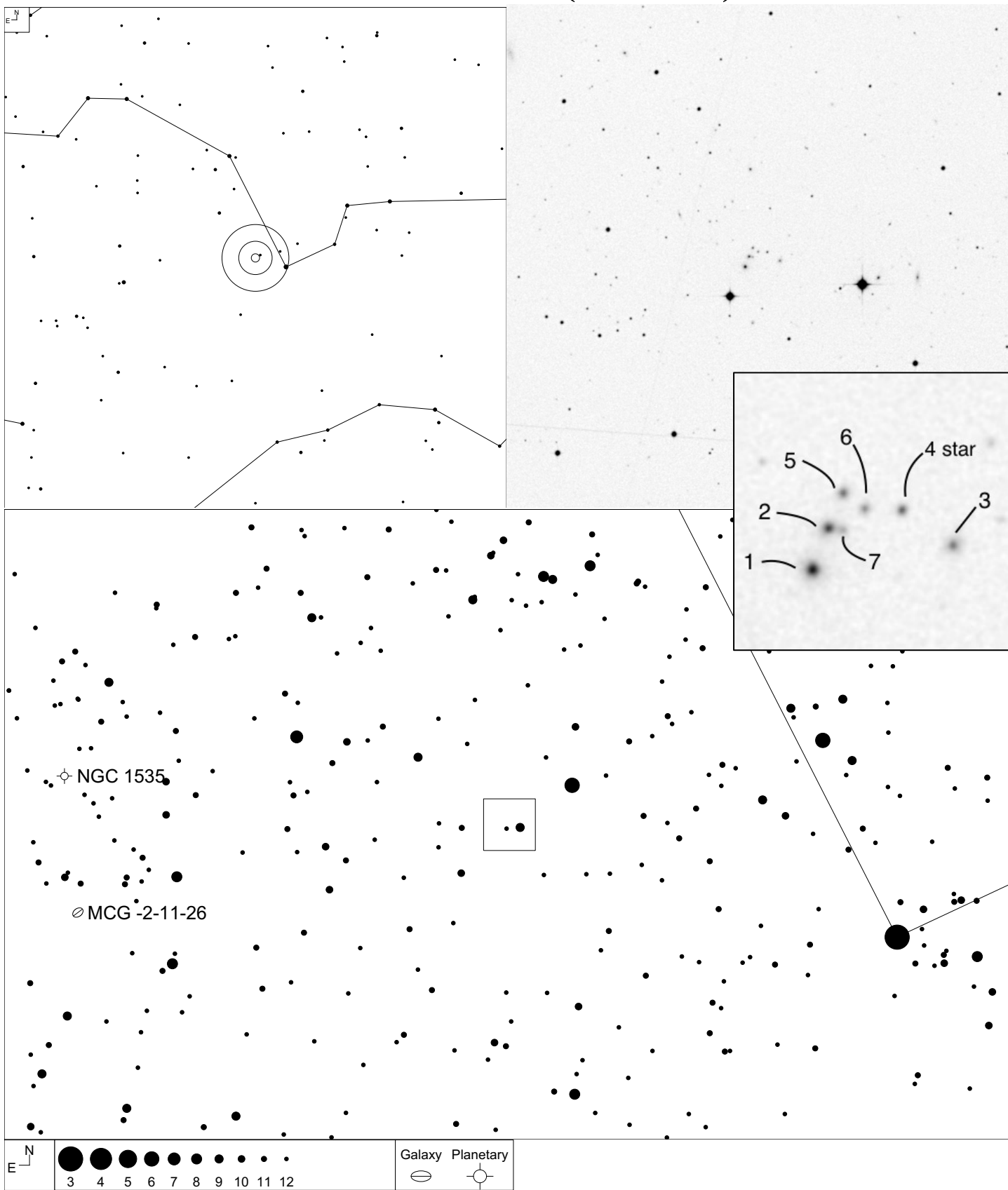
Object	RA	Dec	#	Mag	Size	Cmpt
	02 08 40	-13 57 49	10	16.88*	4'	0.3

Shakhbazian 317 (Cetus)



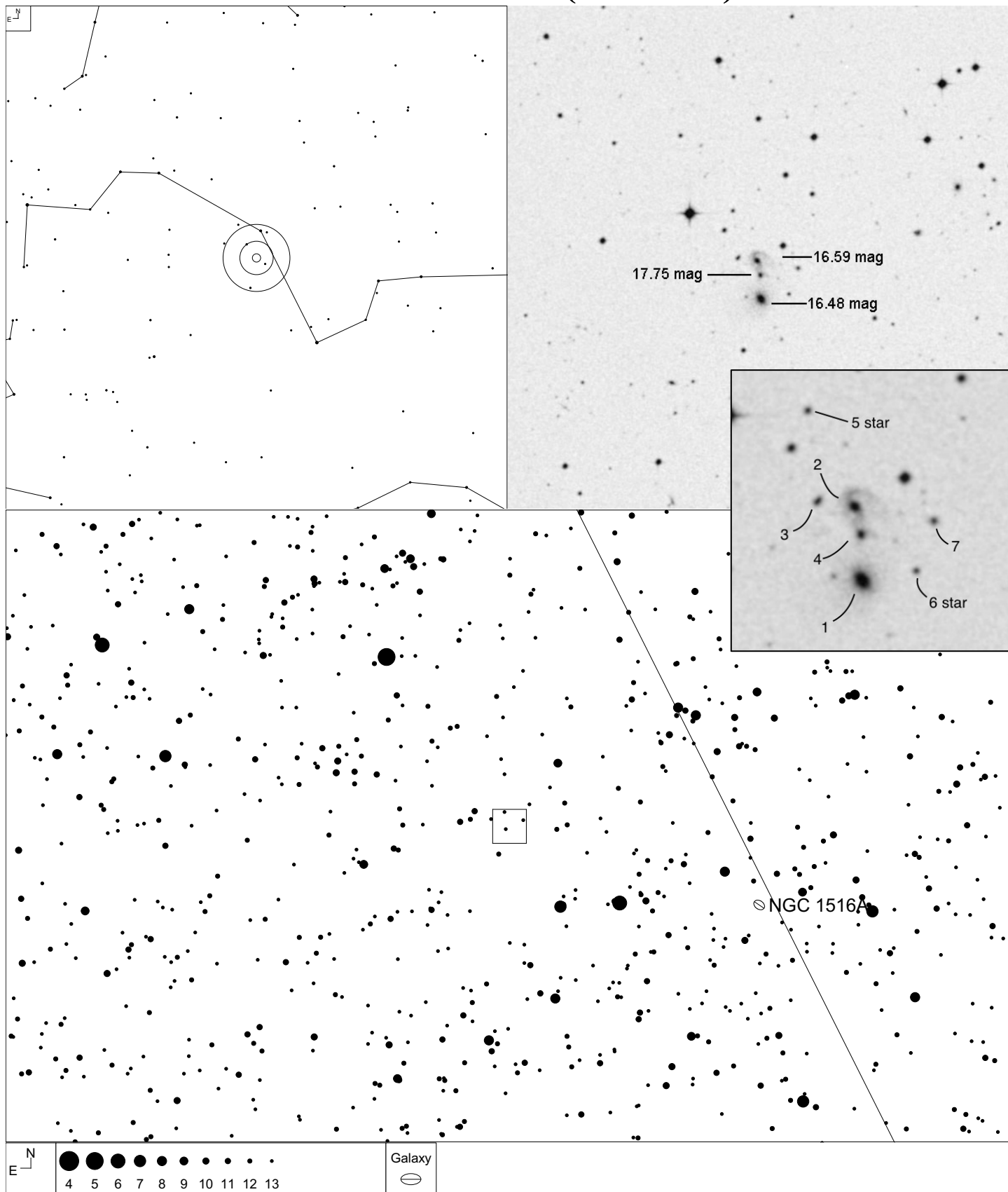
Object	RA	Dec	#	Mag	Size	Cmpt
MCG-1-6-64	02 10 53	-06 33 33	7	15.25*	6.1'	0.2

Shakhbazian 278 (Eridanus)



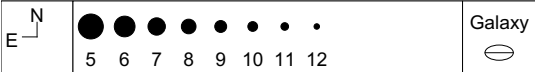
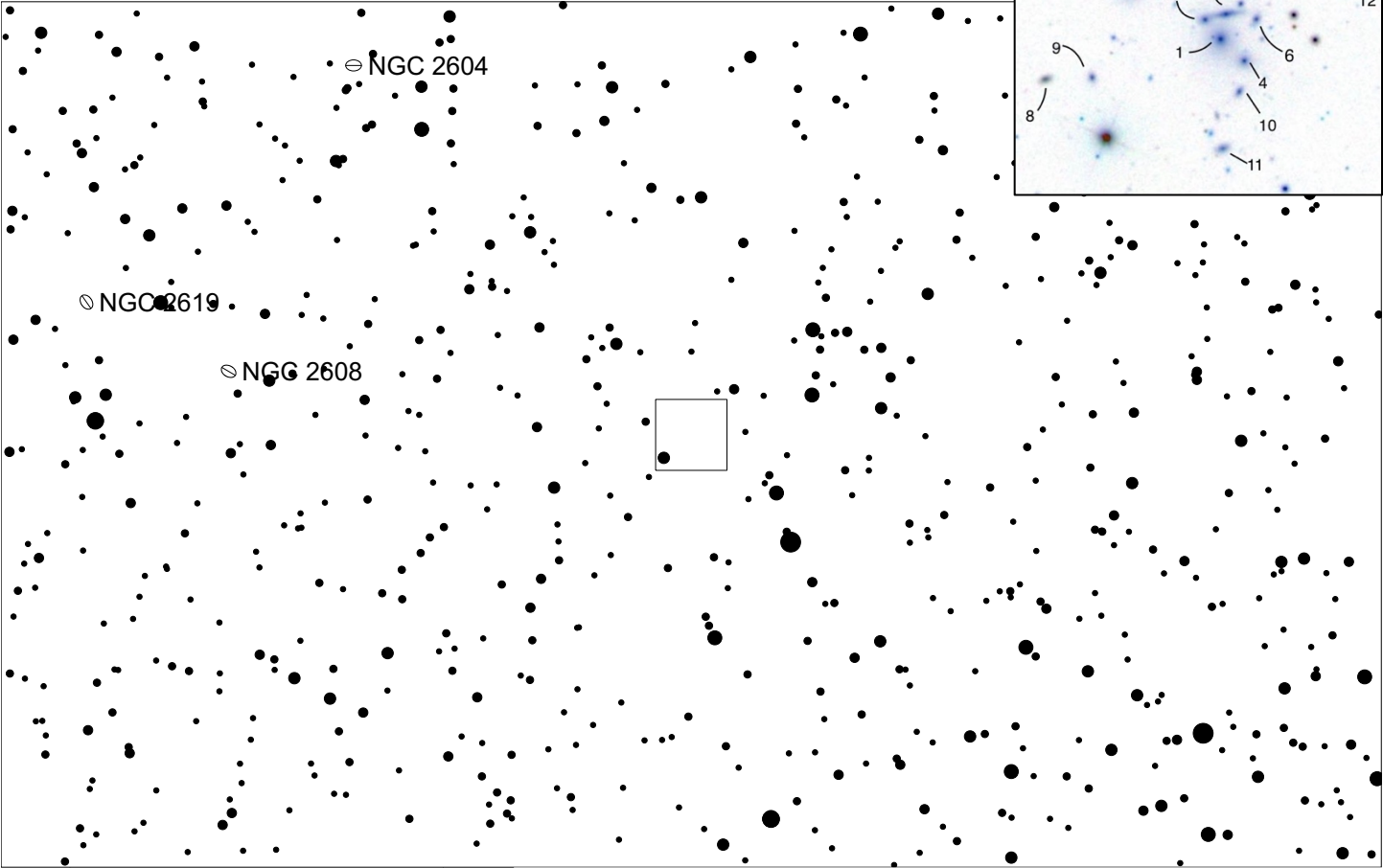
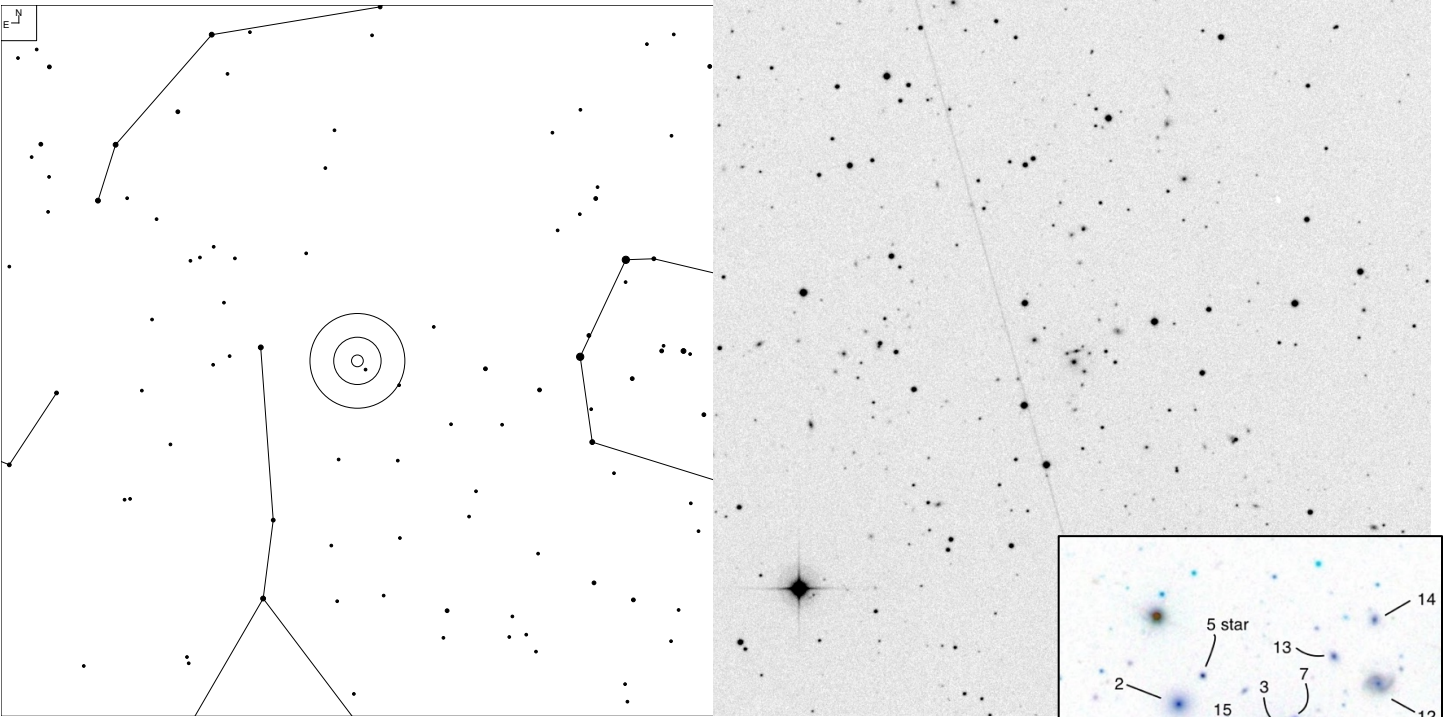
Object	RA	Dec	#	Mag	Size	Cmpt
	04 05 36	-12 58 48	7	17.33*	1.2	0.6

Shakhbazian 279 (Eridanus)



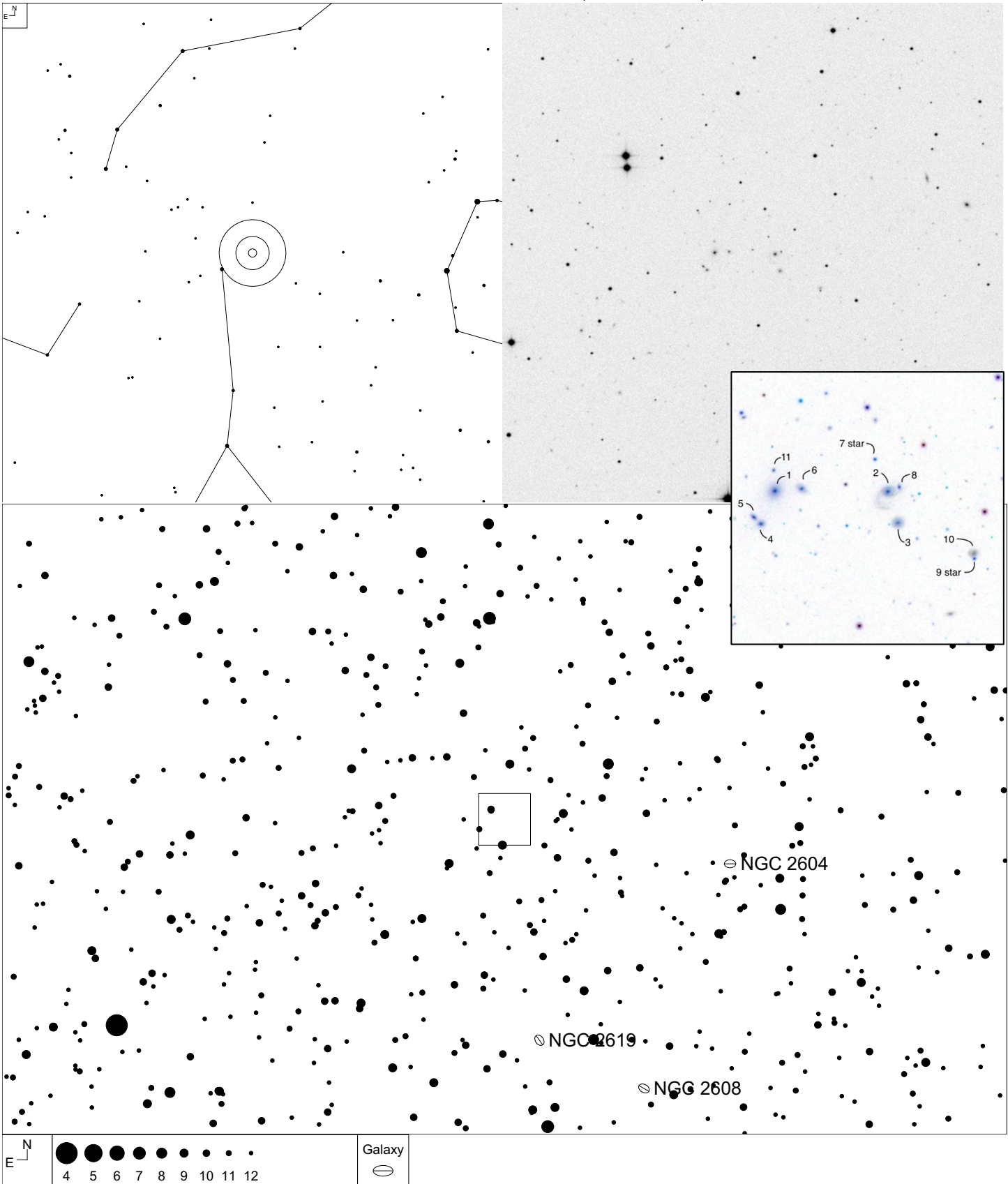
Object	RA	Dec	#	Mag	Size	Cmpt
	04 12 53	-08 29 23	7	16.48*	3.4'	0.4

Shakhbazian 181 (Cancer)



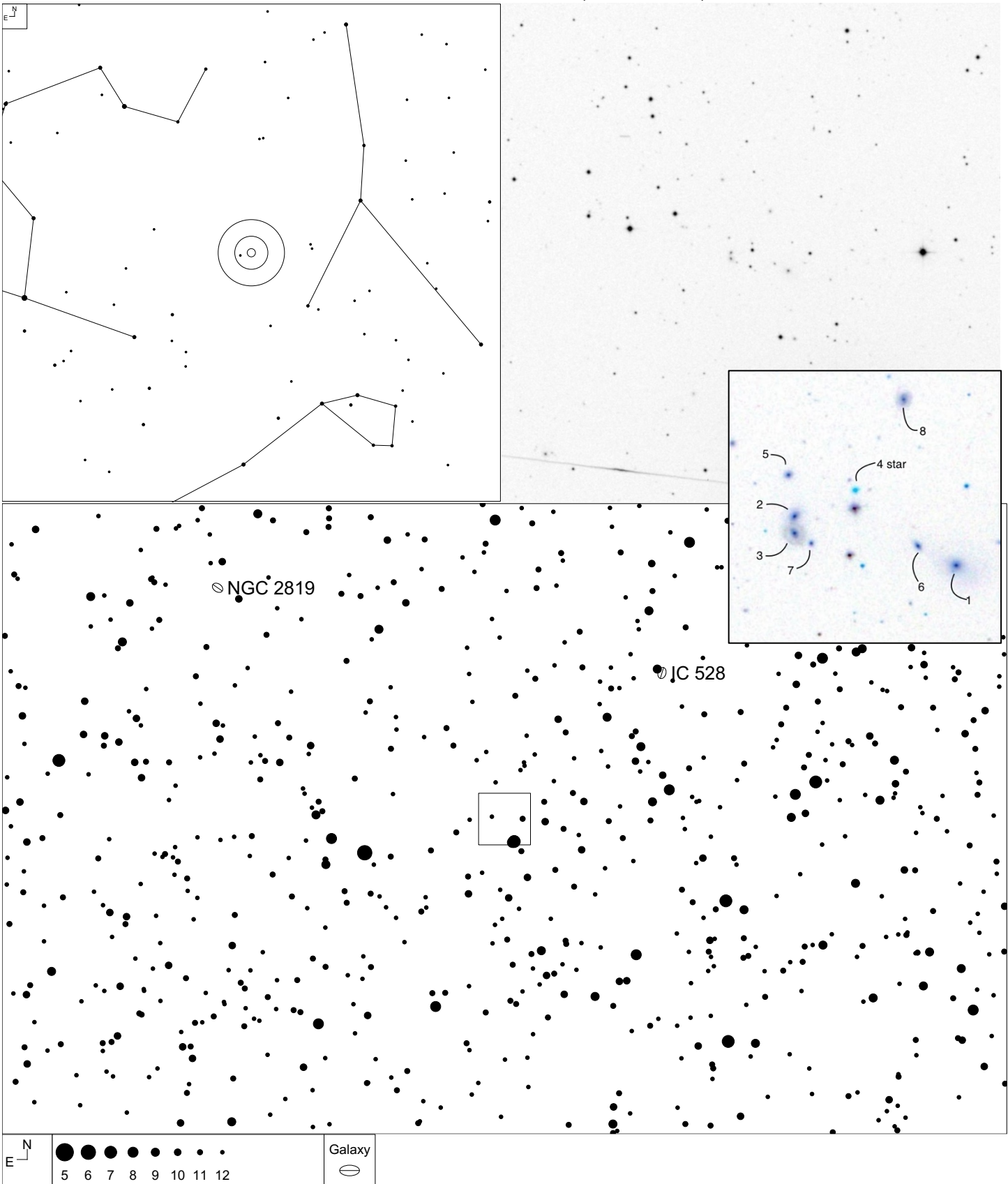
Object	RA	Dec	#	Mag	Size	Cmpt
	08 28 01	+28 15 56	15	16.8	3'	0.4

Shakhbazian 182 (Cancer)



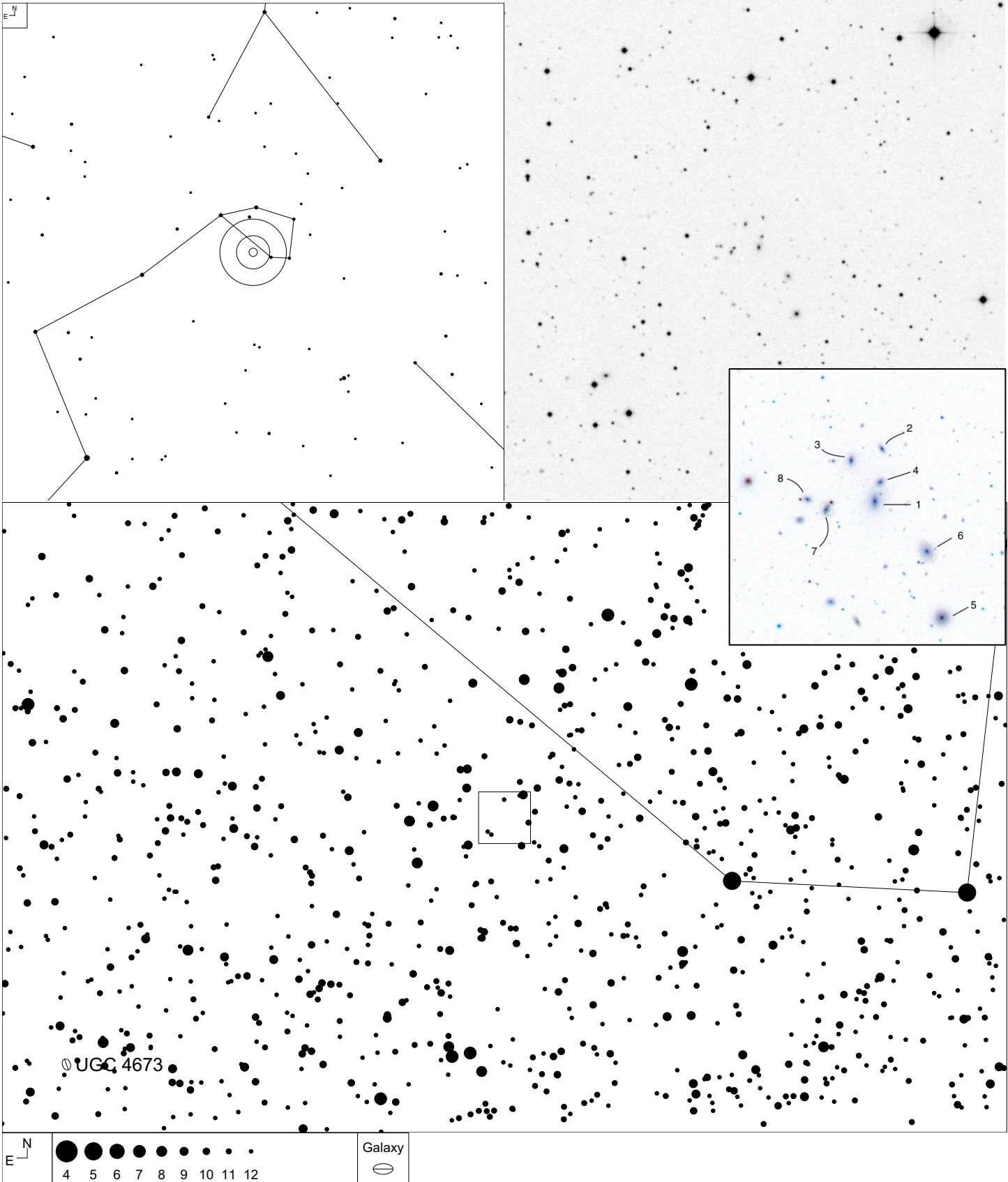
Object	RA	Dec	#	Mag	Size	Cmpt
	08 38 18	+29 45 22	11	17.00*	3.6	0.3

Shakhbazian 345 (Cancer)



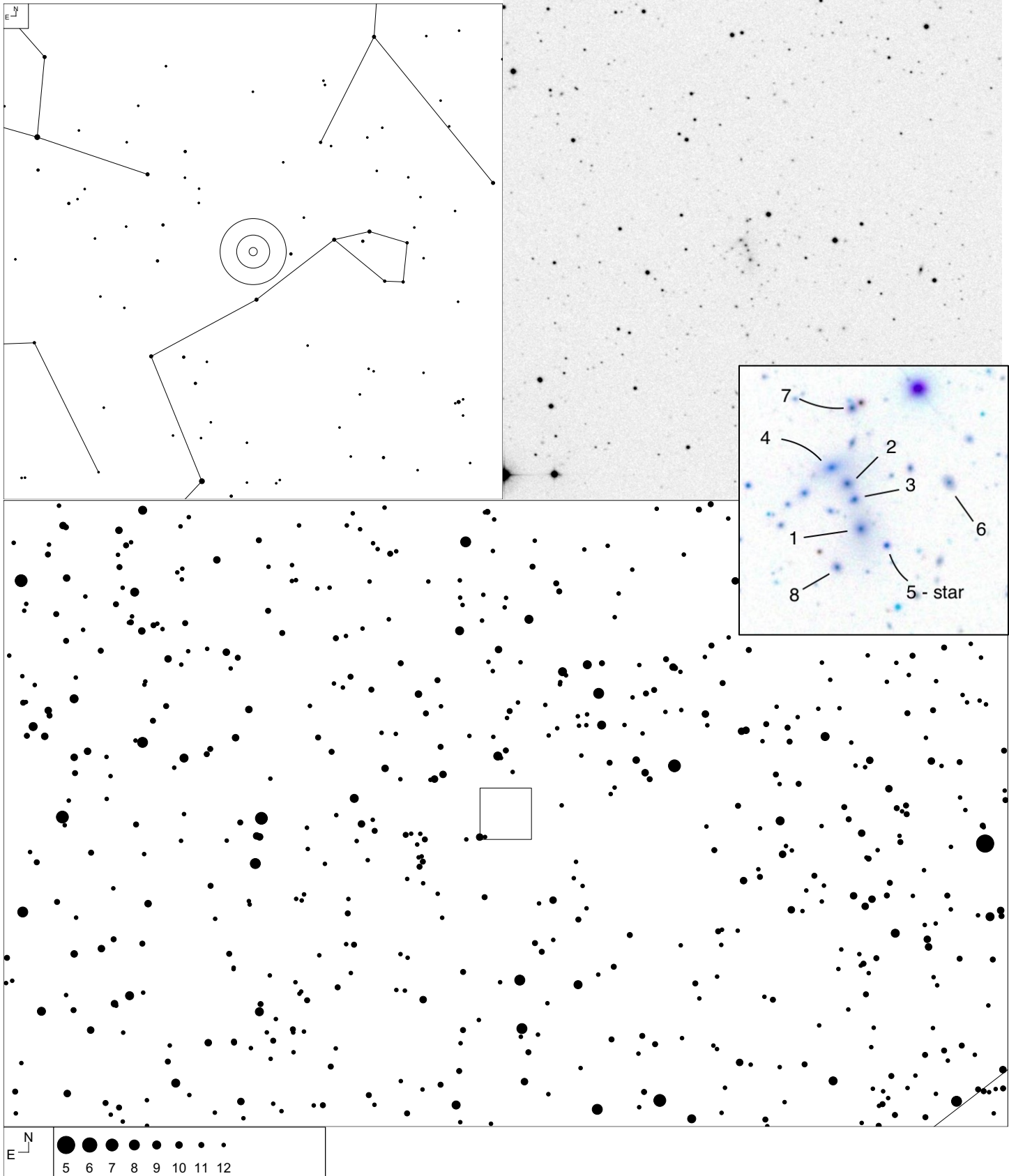
Object	RA	Dec	#	Mag	Size	Cmpt
	09 12 29	+15 06 11	8	17.45	2	0.5

Shakhbazian 344 (Hydra)



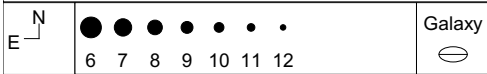
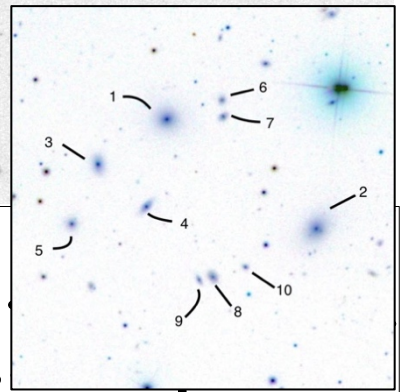
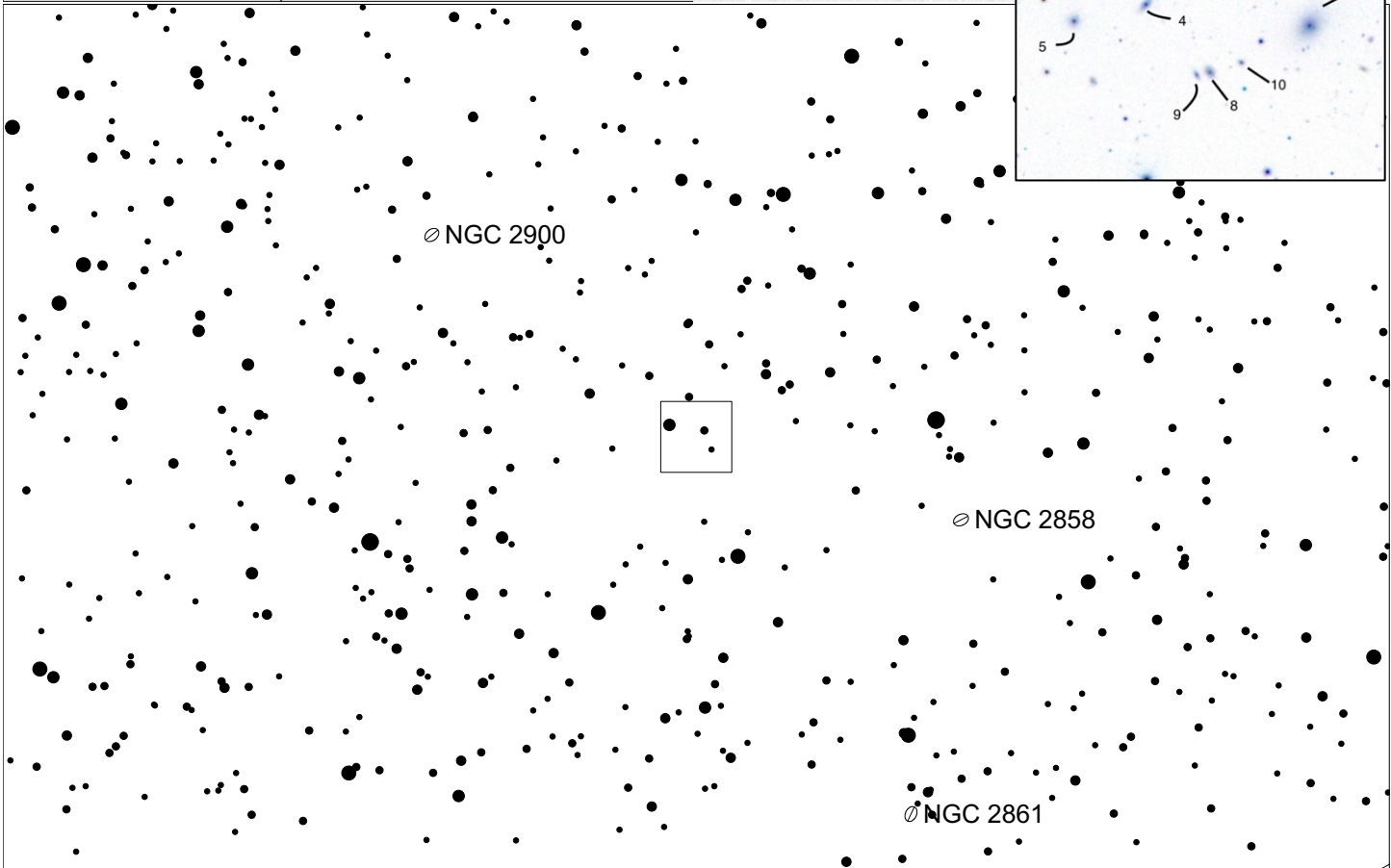
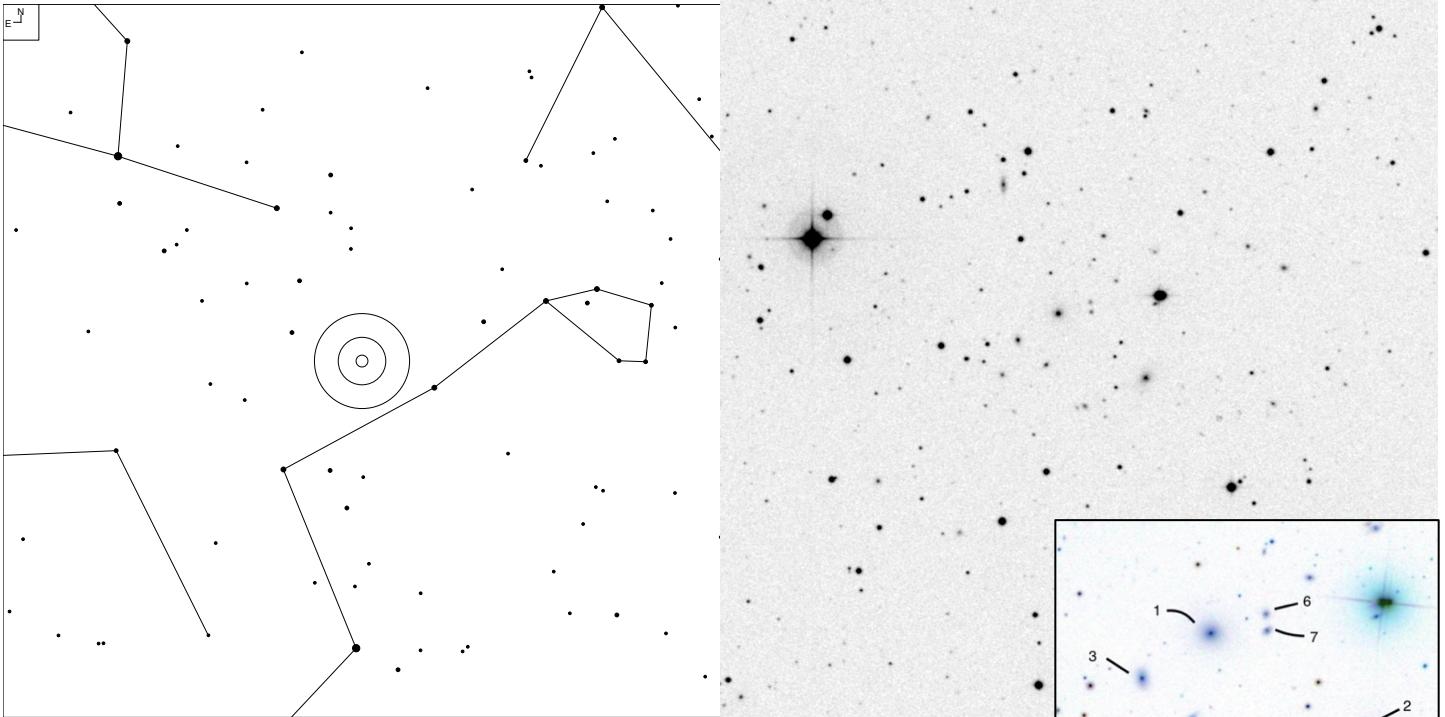
Object	RA	Dec	#	Mag	Size	Cmpt
	08 47 33	+03 42 01	8	16.1	2.9'	0.4

Shakhbazian 346 (Hydra)



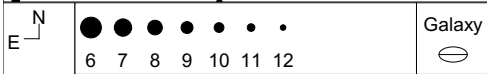
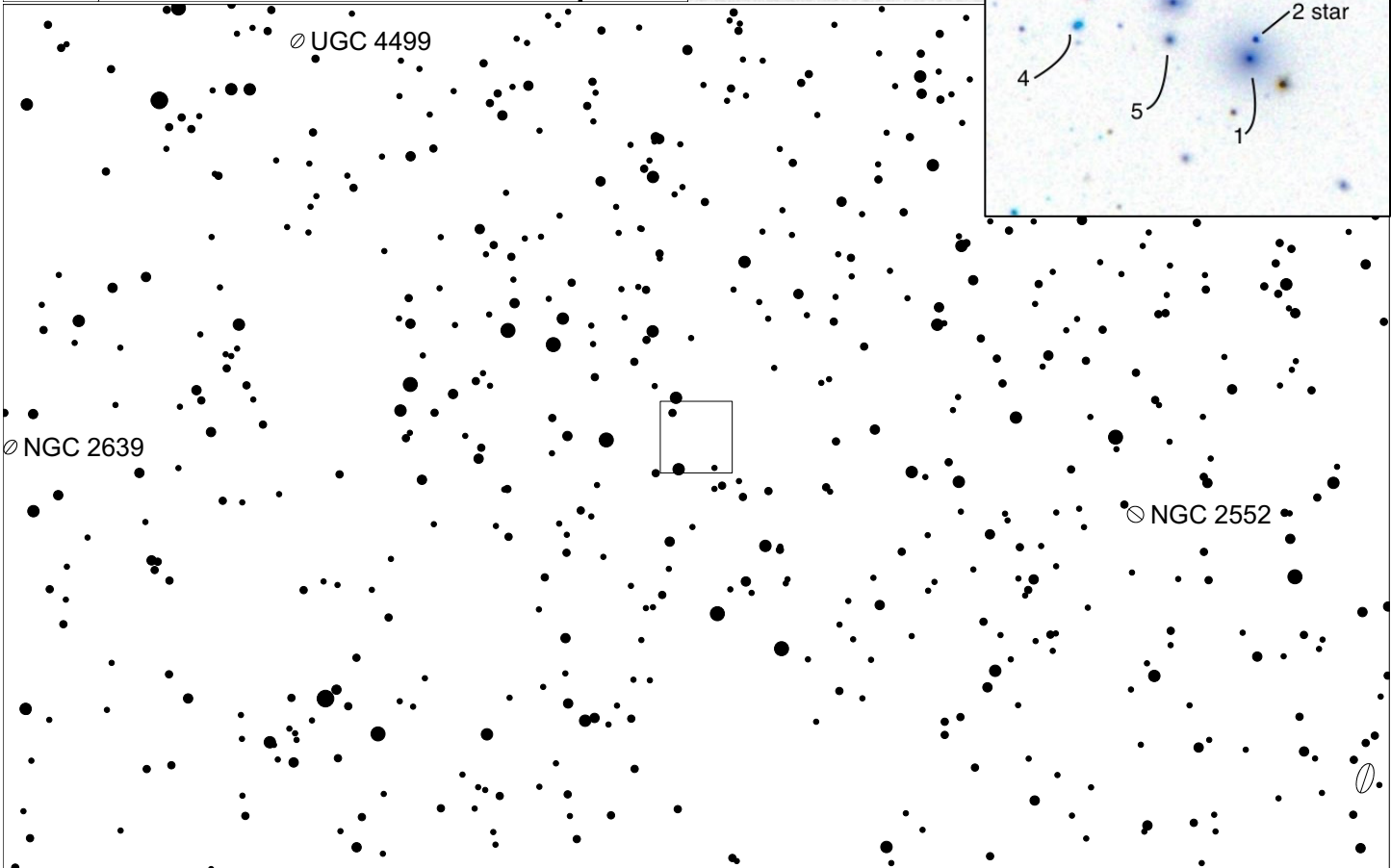
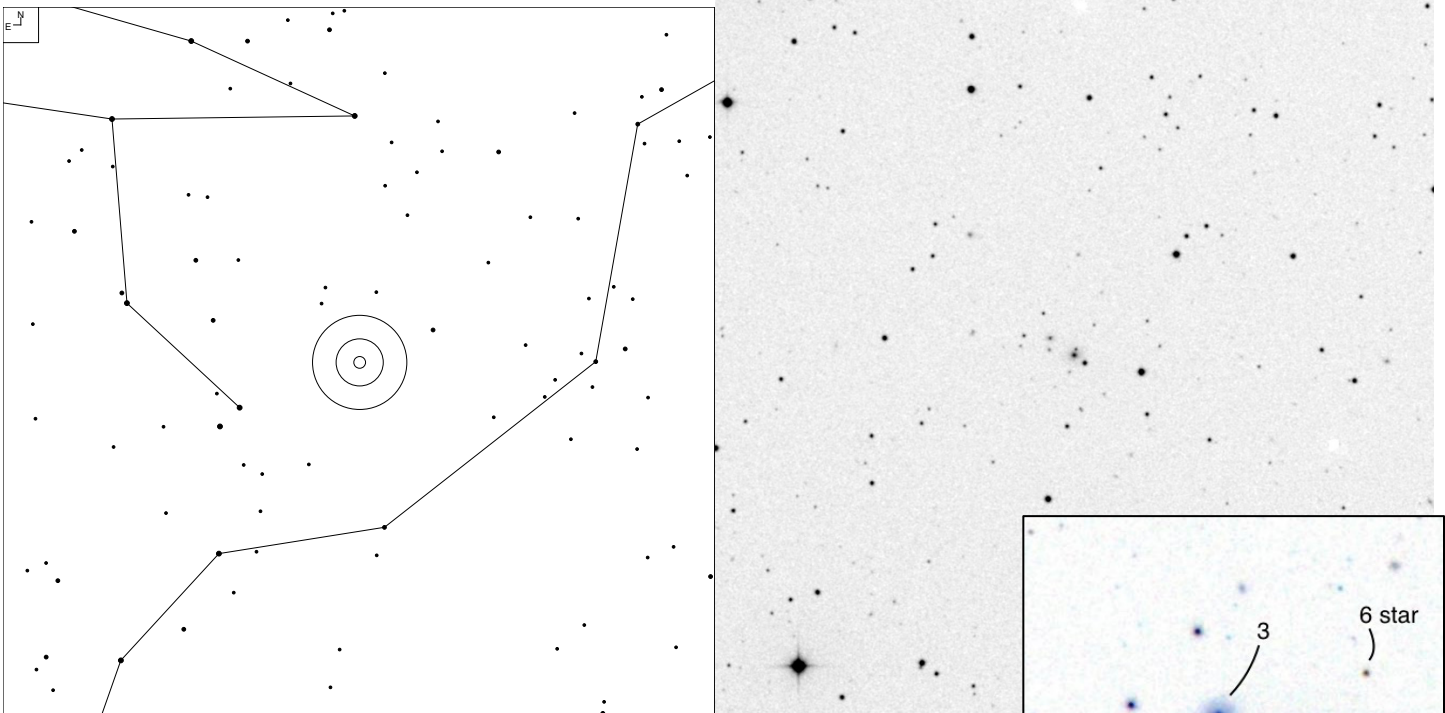
Object	RA	Dec	#	Mag	Size	Cmpt
	09 15 10	+05 14 21	8	17.9	1.2'	0.8

Shakhbazian 348 (Hydra)



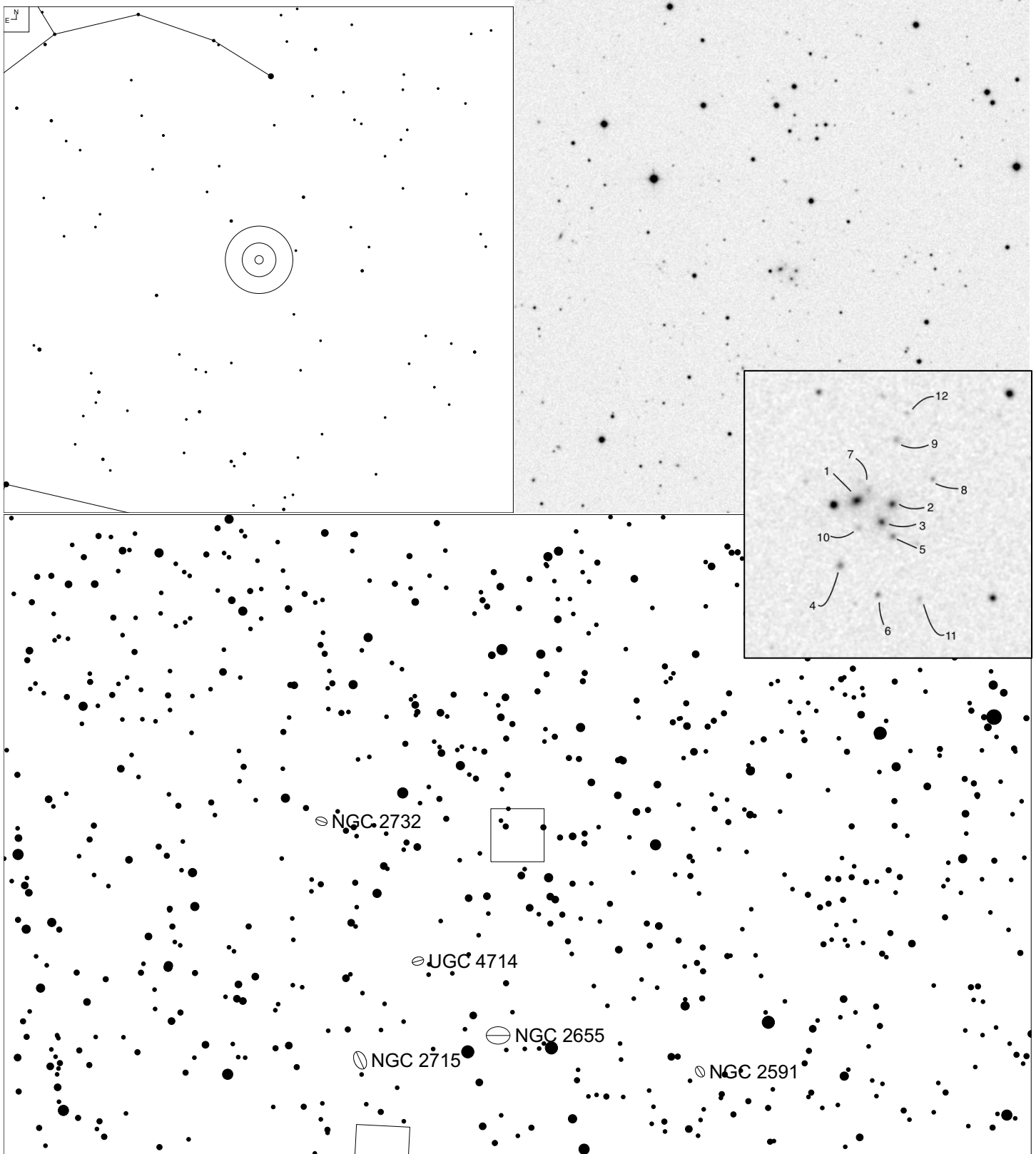
Object	RA	Dec	#	Mag	Size	Cmpt
	09 26 35	+03 26 40	10	16.1*	2.7'	0.5

Shakhbazian 95 (Lynx)



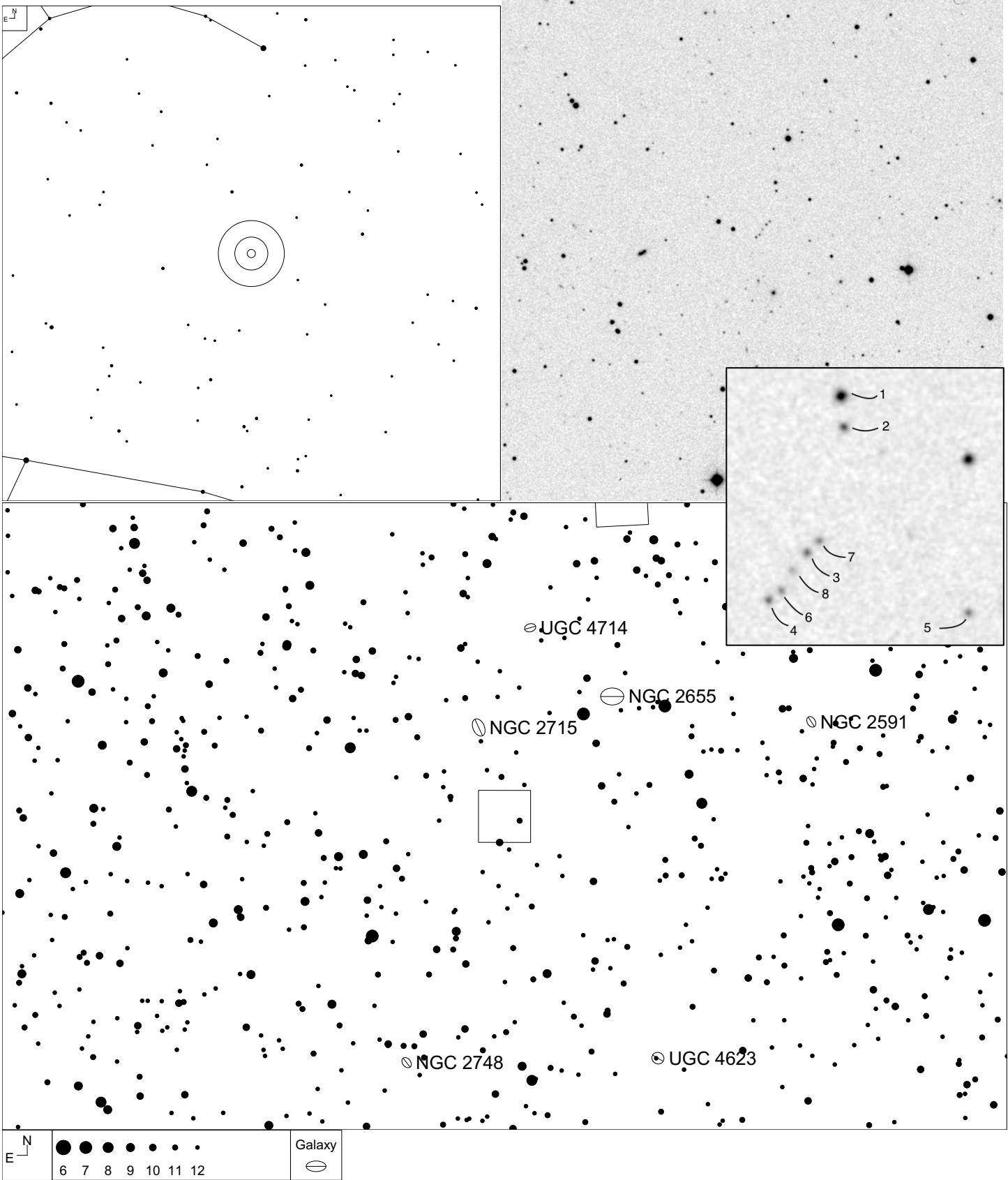
Object	RA	Dec	#	Mag	Size	Cmpt
	08 28 38	+50 17 46	6	16.5	1.1'	0.8

Shakhbazian 18 (Camelopardalis)



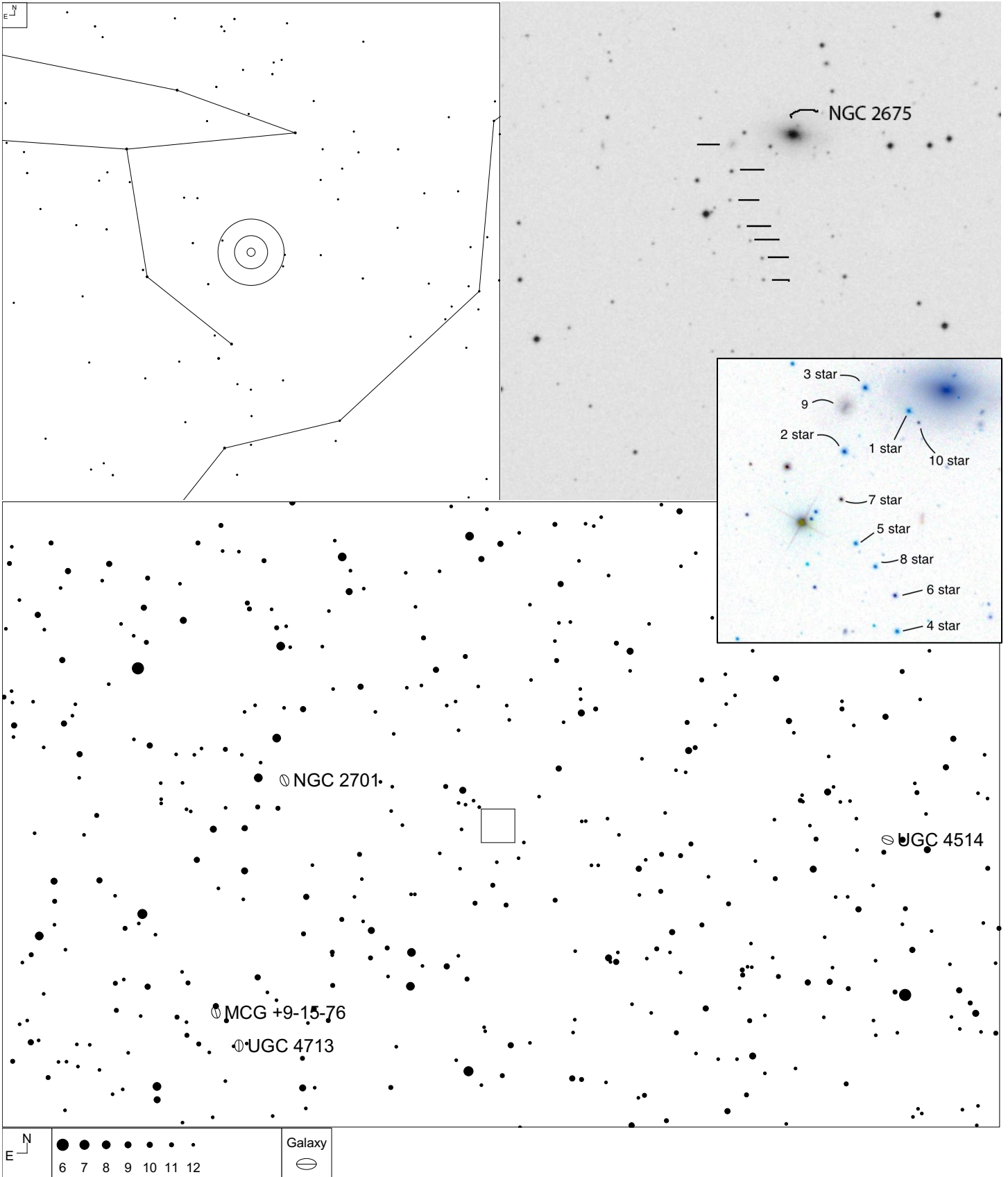
Object	RA	Dec	#	Mag	Size	Cmpt
	08 53 52	+79 09 43	12	15.6*	0.7'	1.3

Shakhbazian 17 (Camelopardalis)



Object	RA	Dec	#	Mag	Size	Cmpt
	09 05 51	+77 39 03	8	16.3*	0.6'	0.8

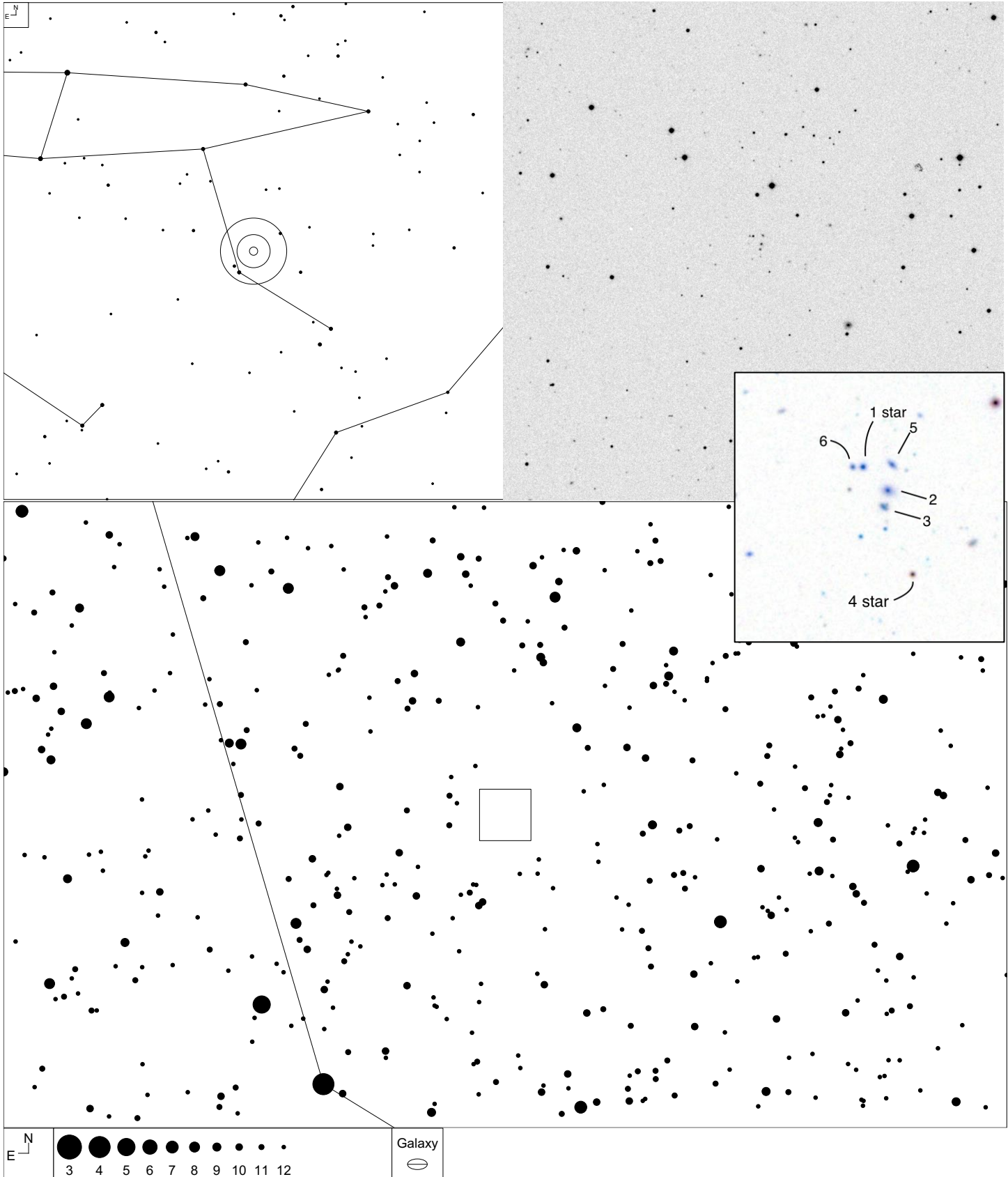
Shakhbazian 98 (Ursa Major)



Object	RA	Dec	#	Mag	Size	Cmpt
	08 52 08	+53 36 49	10	16.7	3'	0.3

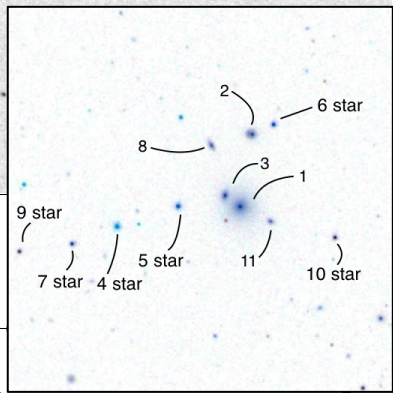
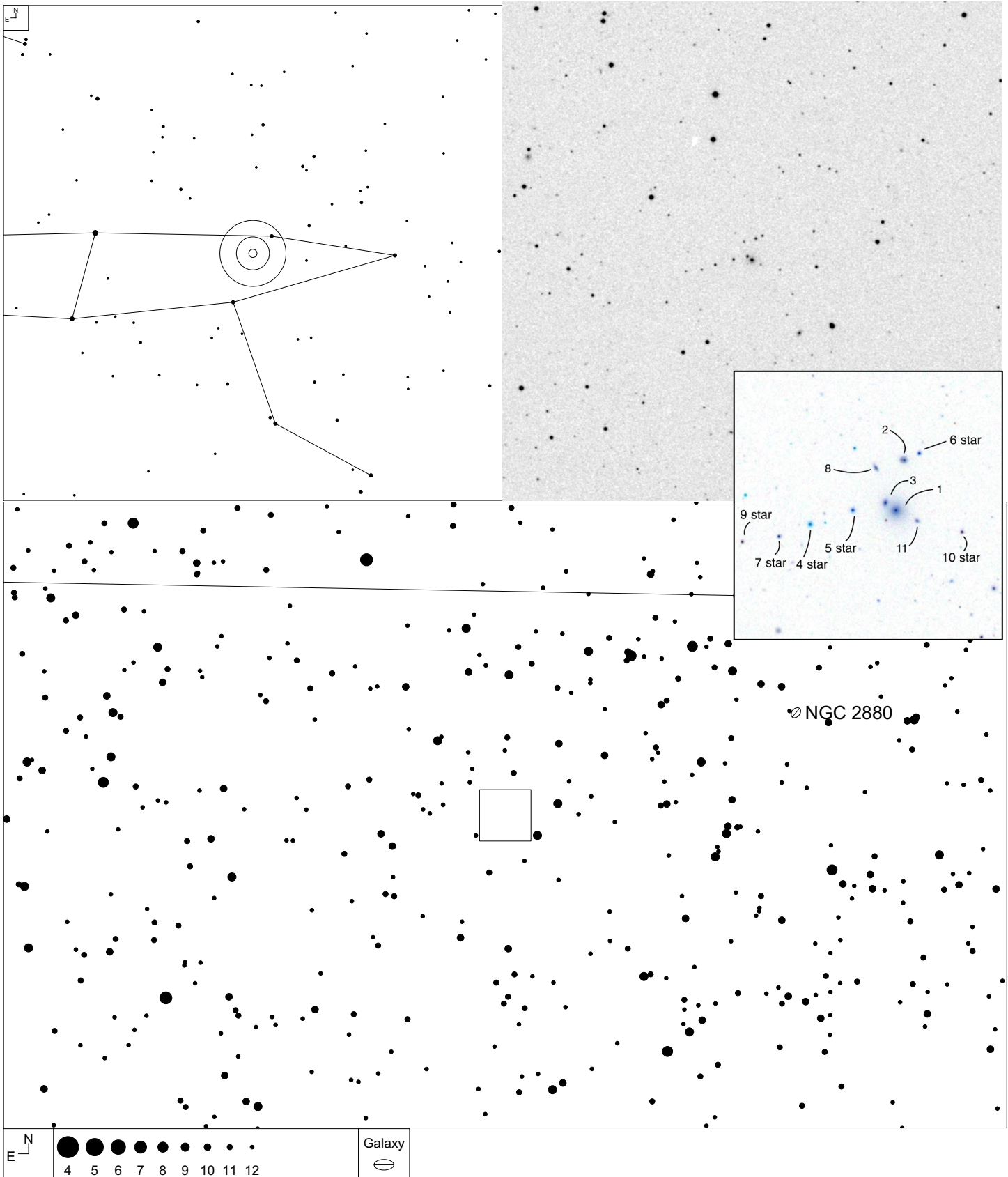
This was a candidate to be deleted, but I decided to keep it as it has a cool chain of faint stars.

Shakhbazian 104 (Ursa Major)



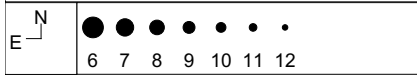
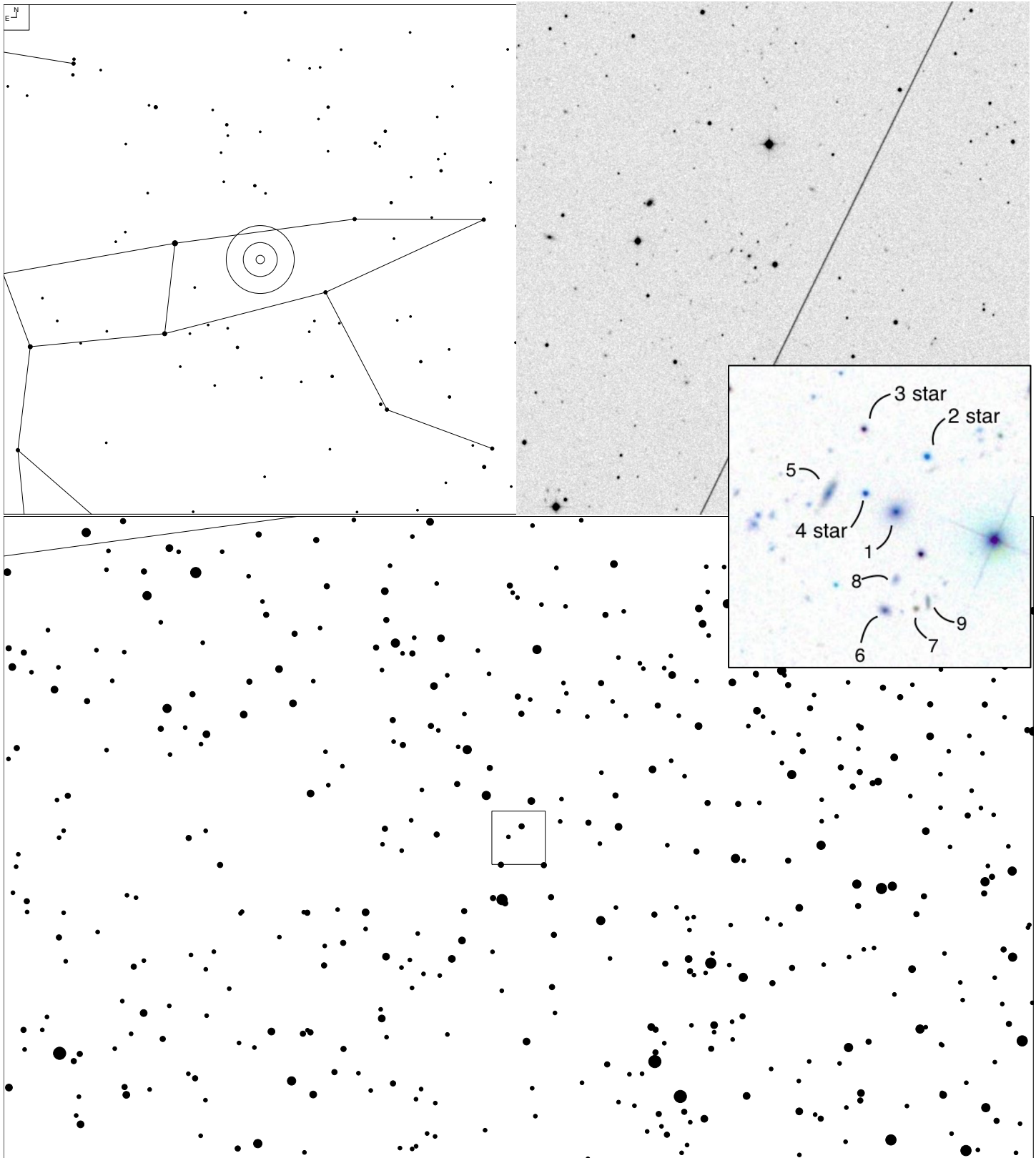
Object	RA	Dec	#	Mag	Size	Cmpt
	09 27 15	+52 58 29	6	17.8	1.2'	0.4

Shakhbazian 105 (Ursa Major)



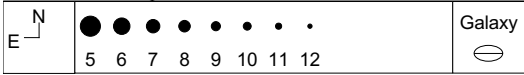
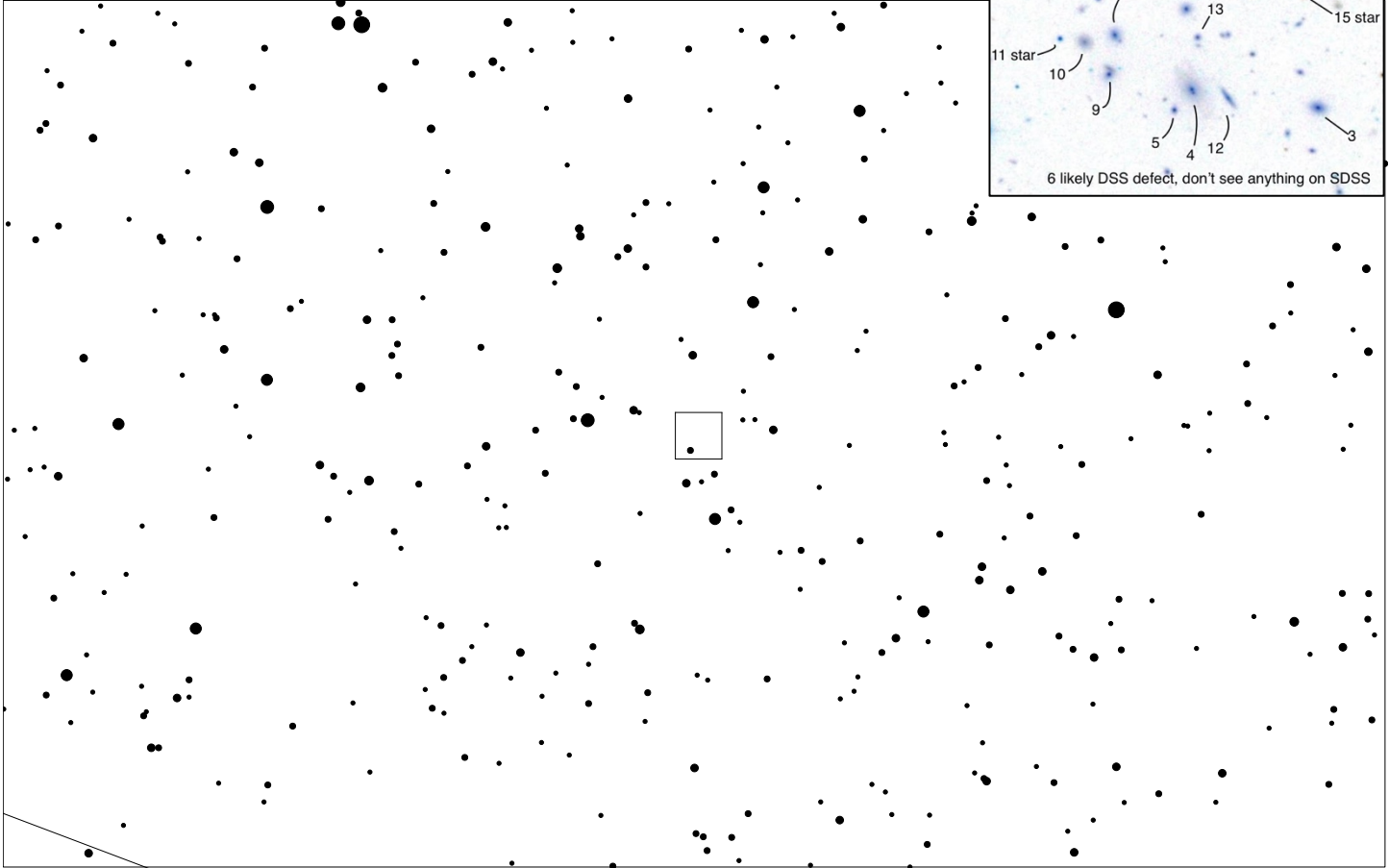
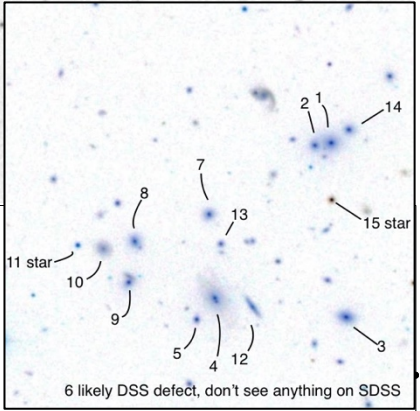
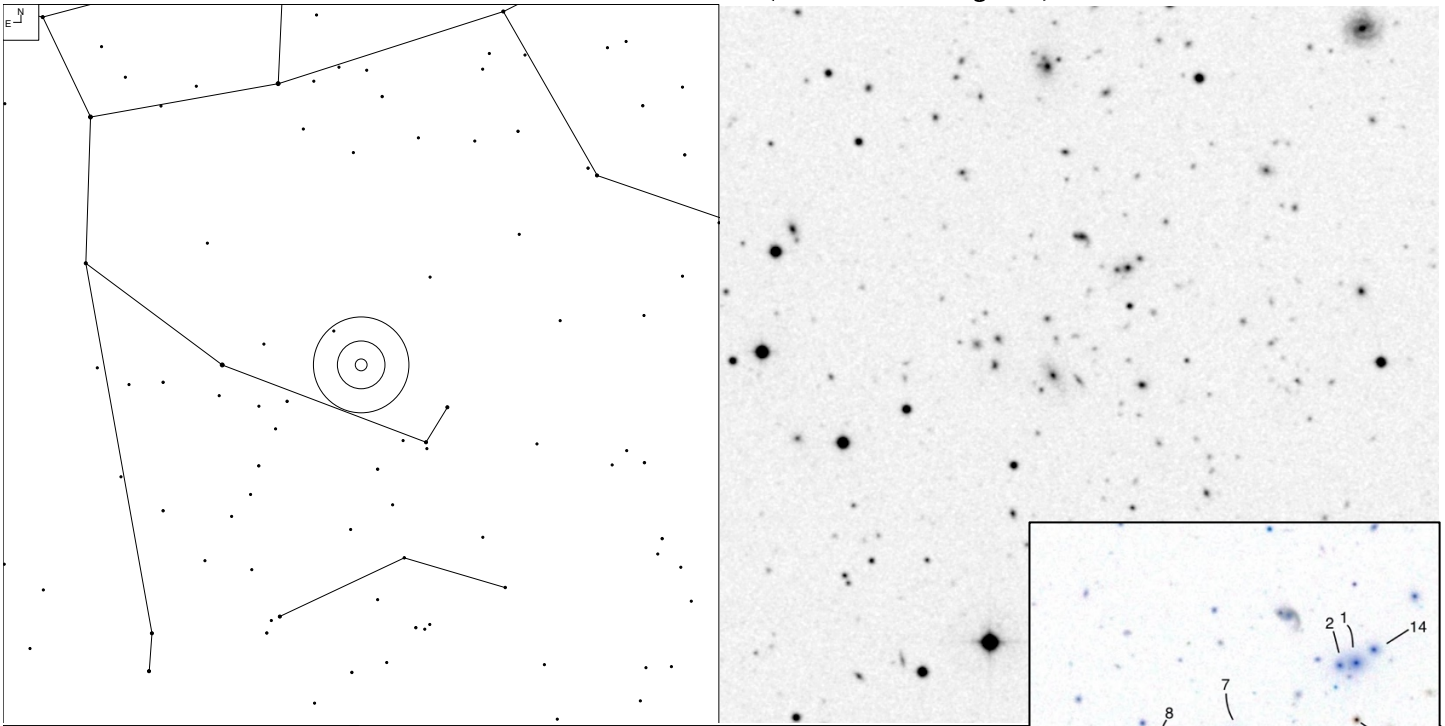
Object	RA	Dec	#	Mag	Size	Cmpt
	09 41 37	+62 01 56	11	16.5	2.6'	0.3

Shakhbazian 113 (Ursa Major)



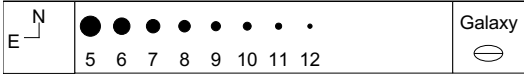
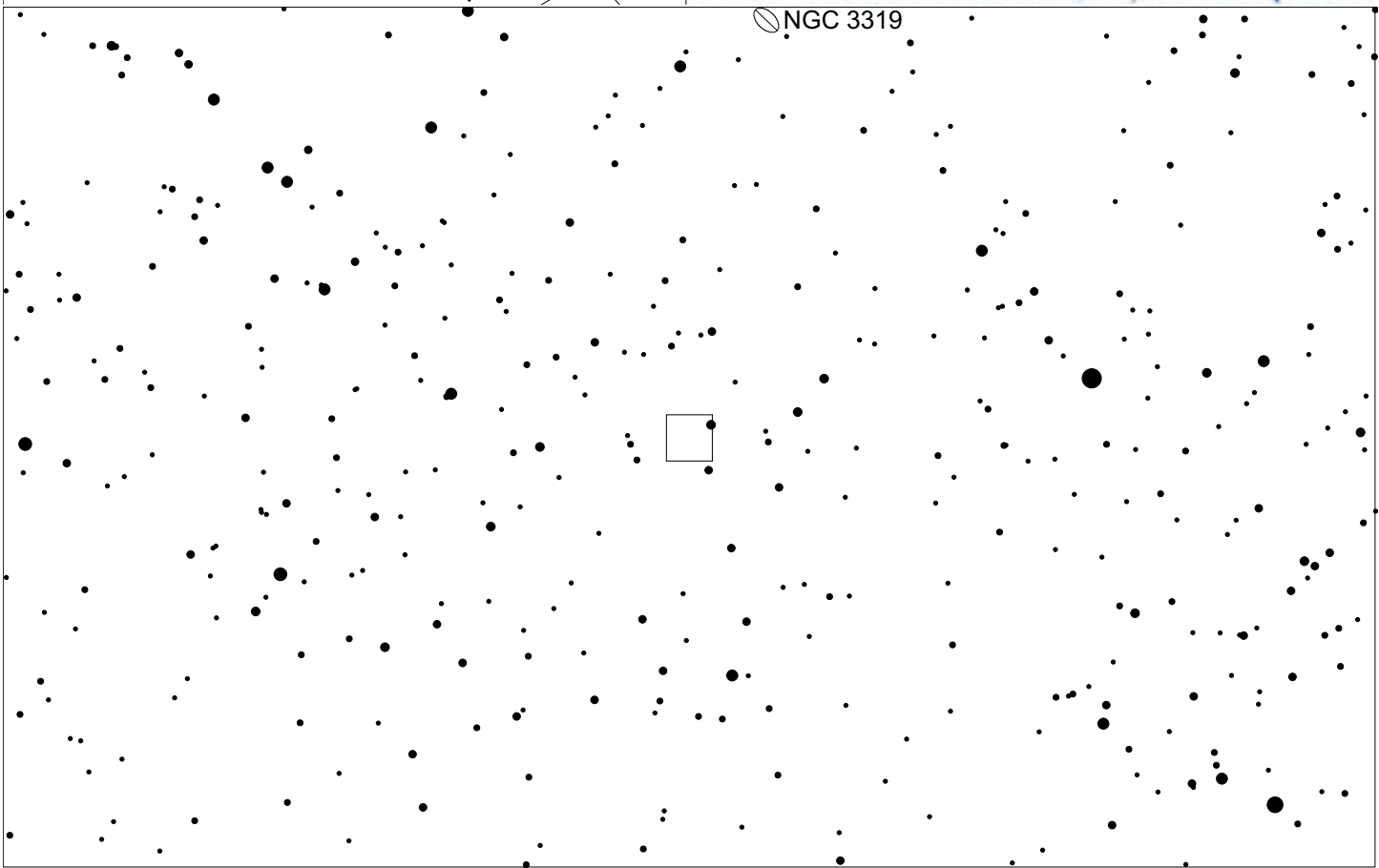
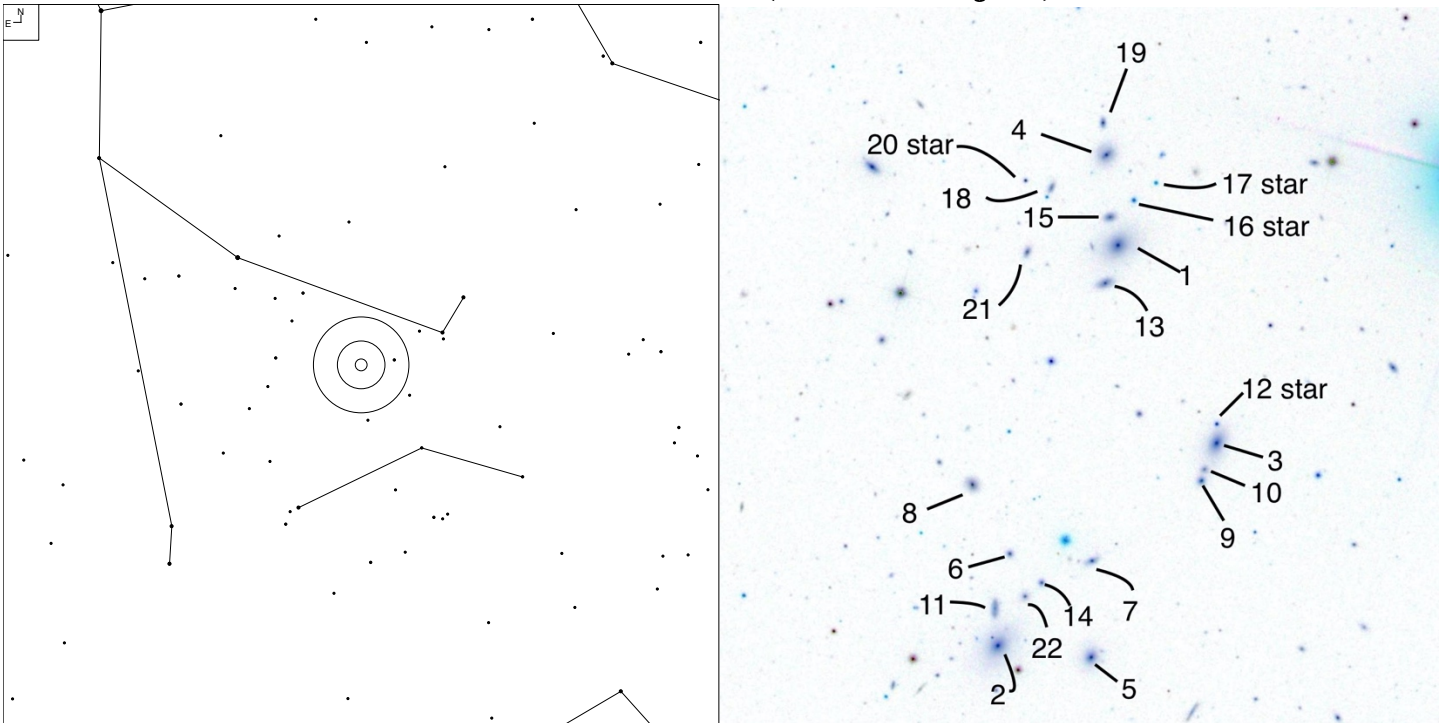
Object	RA	Dec	#	Mag	Size	Cmpt
	10 21 06	+61 12 04	9	17.7	1.5'	0.4

Shakhbazian 53 (Ursa Major)



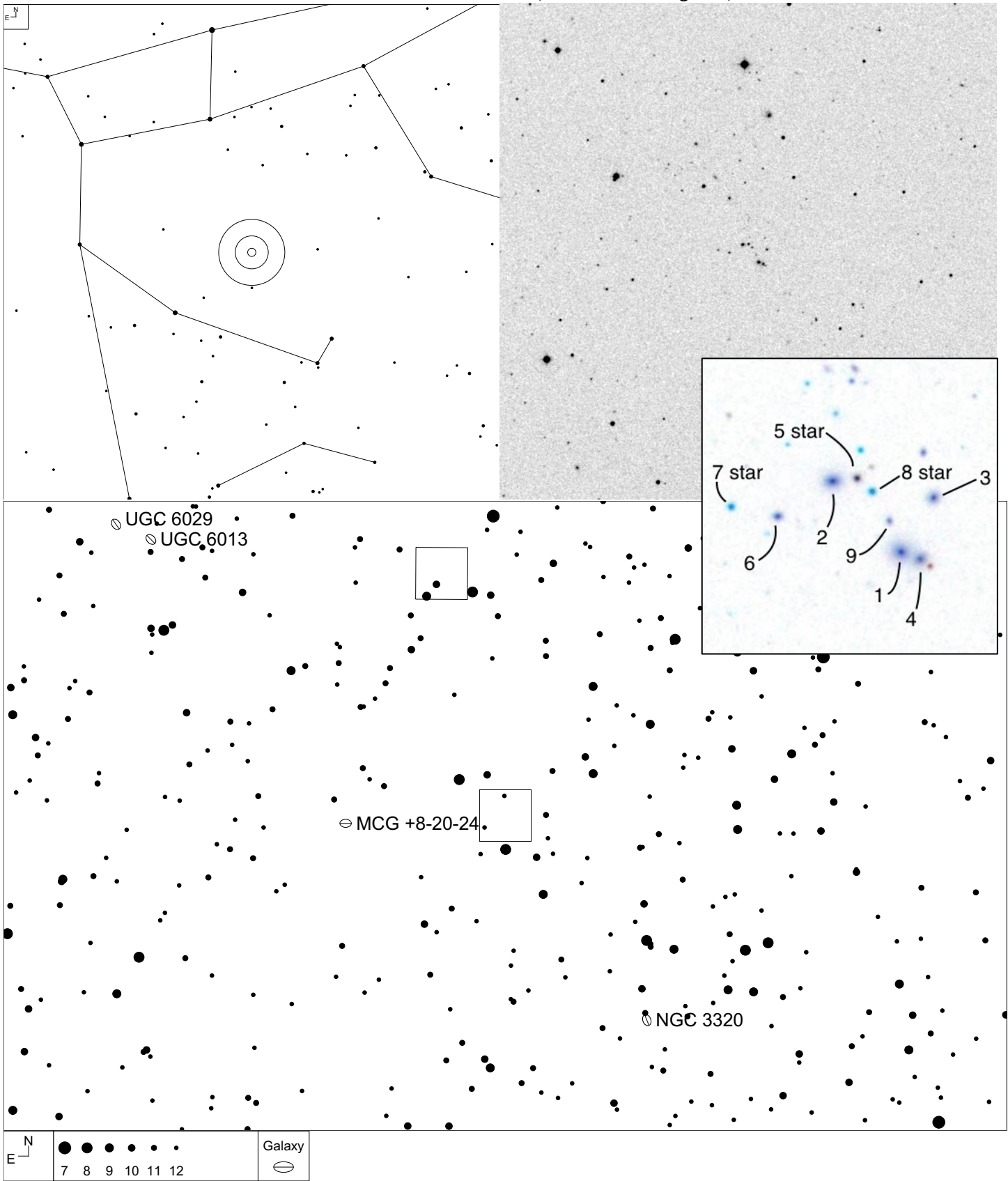
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1050	10 36 51	+44 48 32	15	17.2	-	

Shakhbazian 54 (Ursa Major)



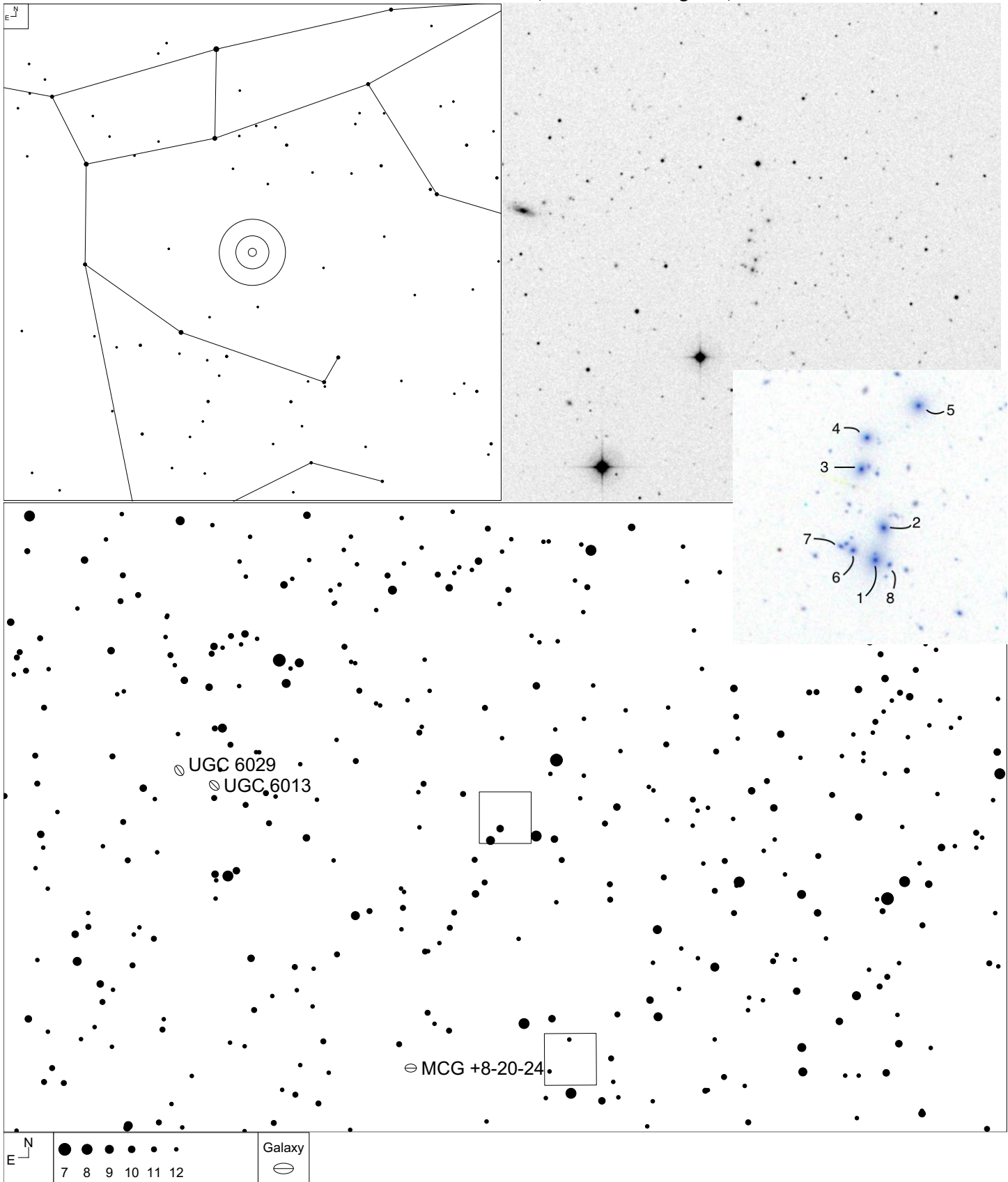
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1067	10 40 36	+40 14 00	22	16.5	5.5'	0.5

Shakhbazian 55 (Ursa Major)



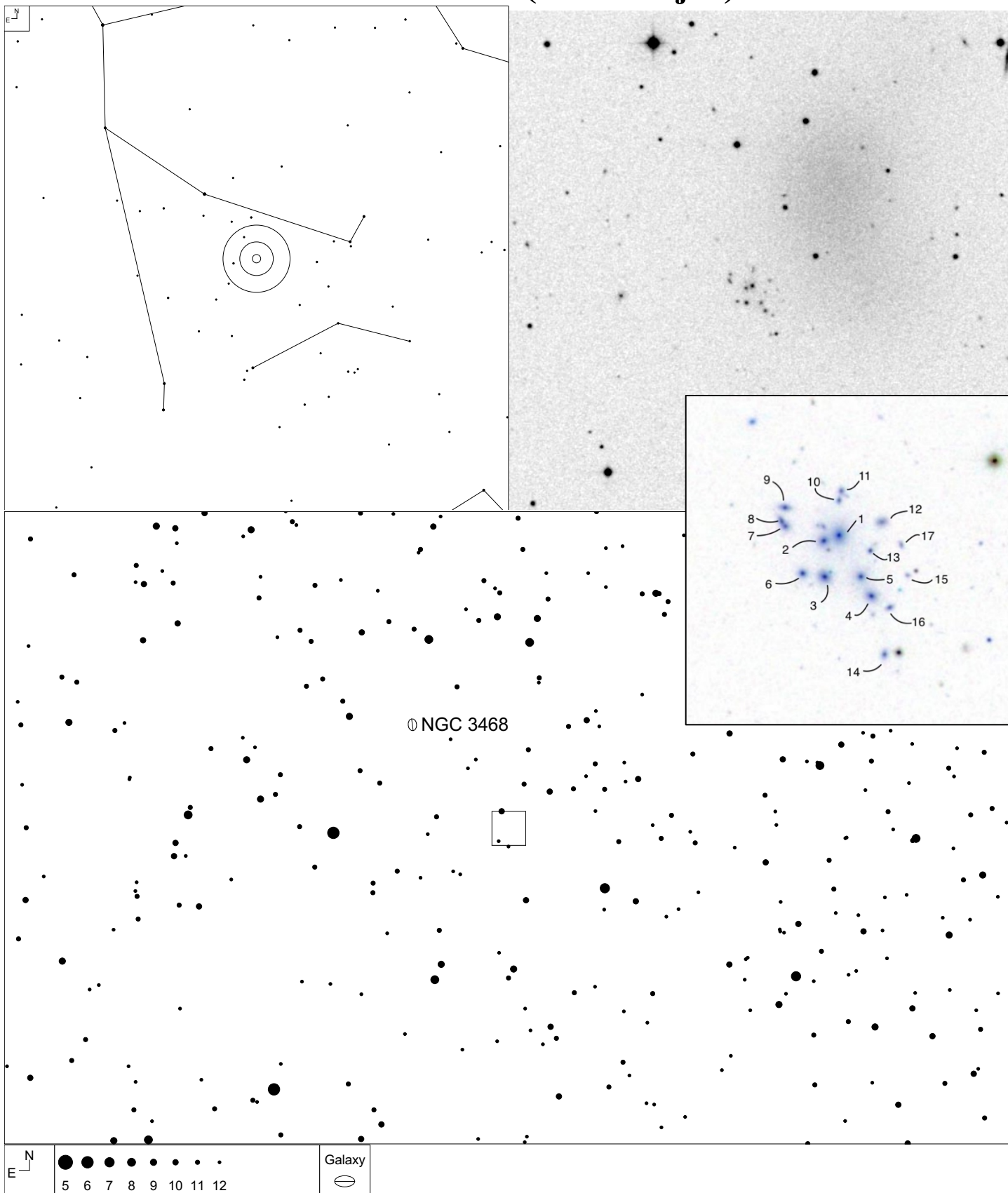
Object	RA	Dec	#	Mag	Size	Cmpt
	10 43 35	+48 22 30	9	17.2	1.5'	0.6

Shakhbazian 57 (Ursa Major)



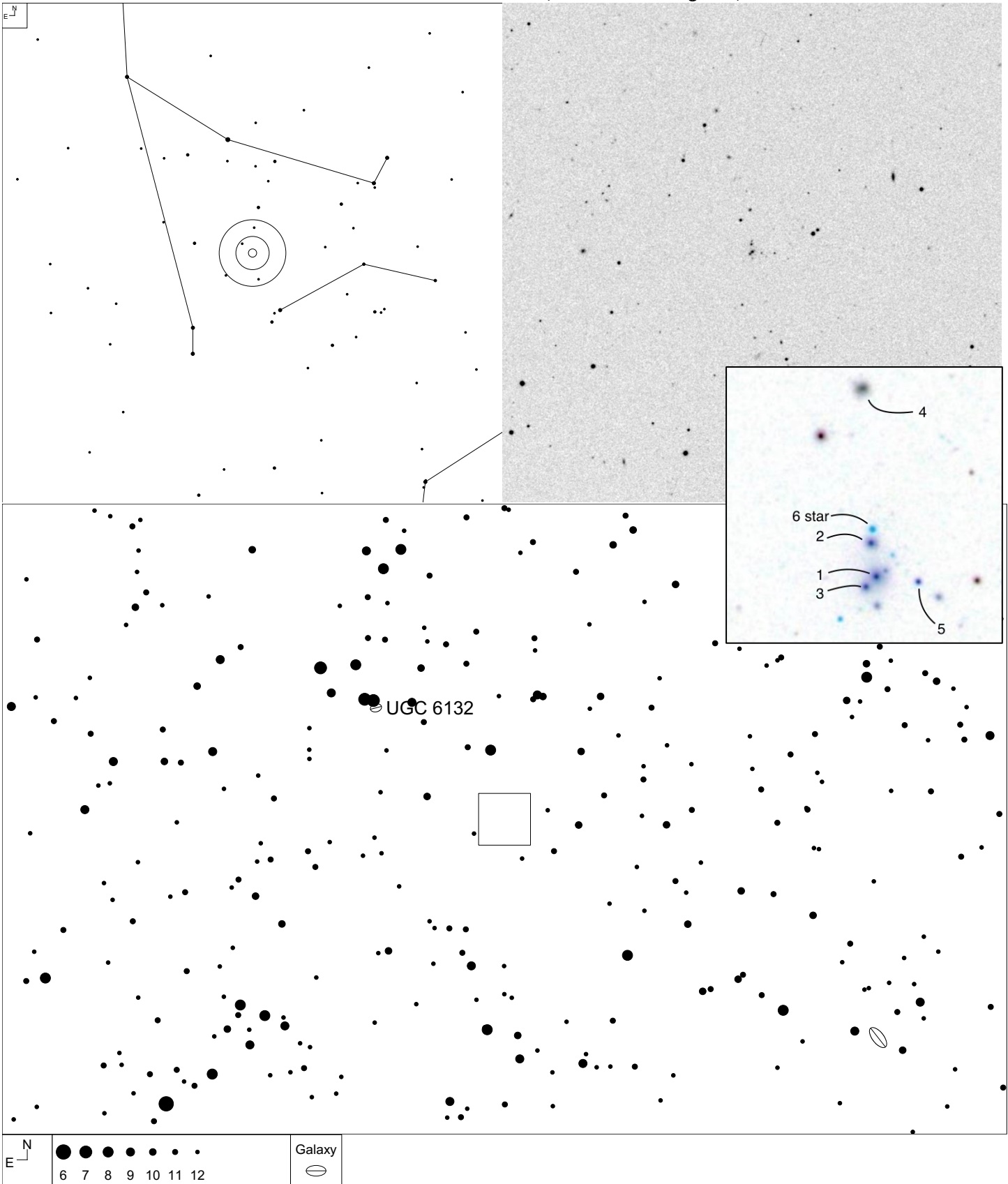
Object	RA	Dec	#	Mag	Size	Cmpt
III Zw 20	10 45 27	+49 31 38	8	18.0	-	-

Shakhbazian 1 (Ursa Major)



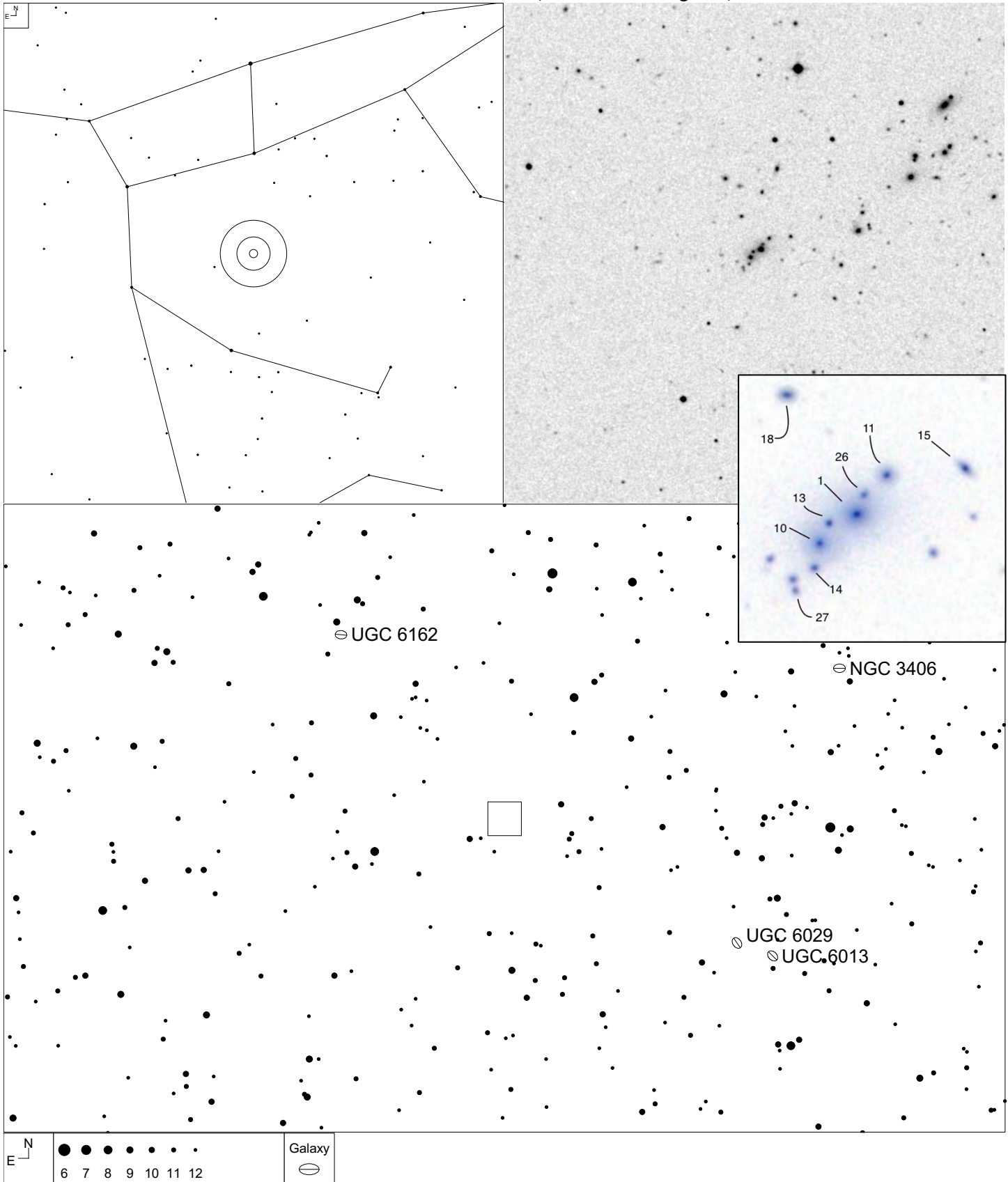
Object	RA	Dec	#	Mag	Size	Cmpt
PGC 32808	10 55 05	+40 27 14	17	16.0	1.4'	1.1

Shakhbazian 119 (Ursa Major)



Object	RA	Dec	#	Mag	Size	Cmpt
	11 01 21	+37 40 44	6	17.81*	1.2	0.5

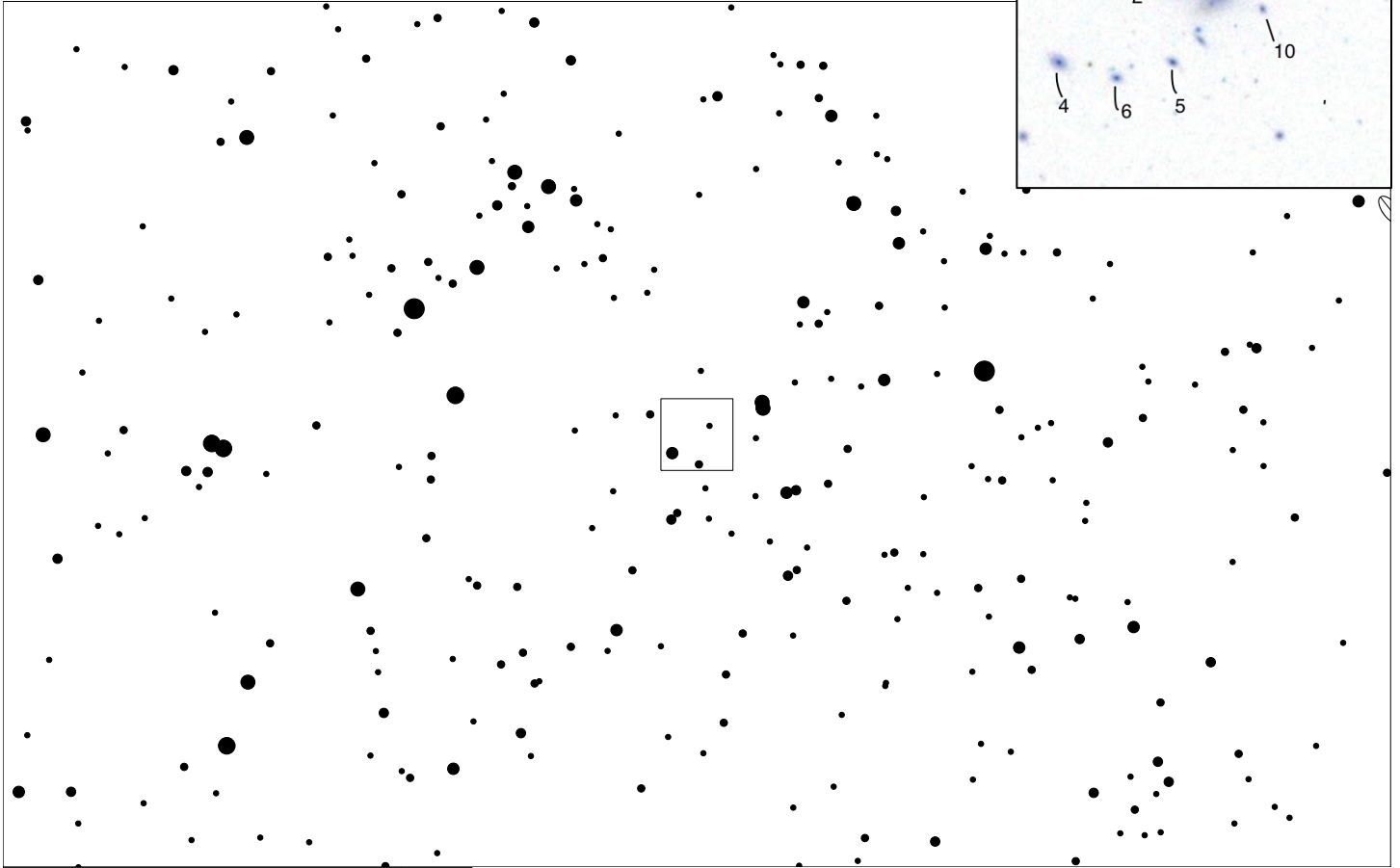
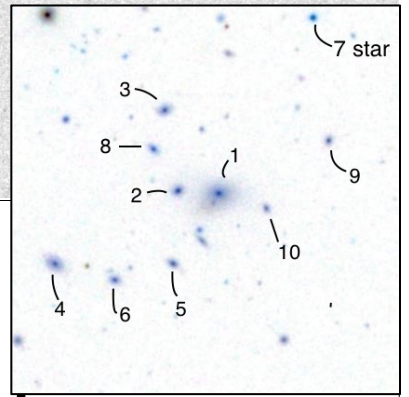
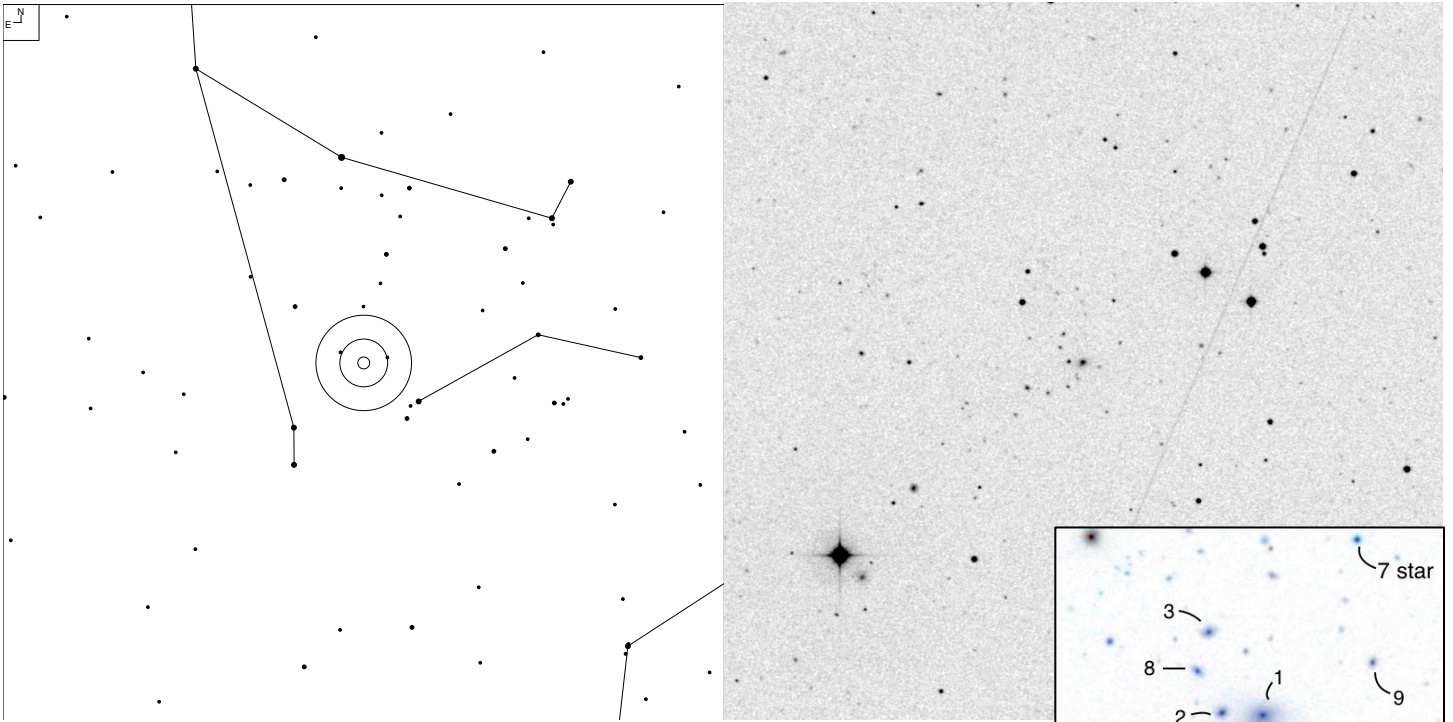
Shakhbazian 26 (Ursa Major)



Object	RA	Dec	#	Mag	Size	Cmpt
MCG+8-20-69A (AGC 1143)	11 02 12	+50 20 58	9 ¹	17.2	1'	0.7

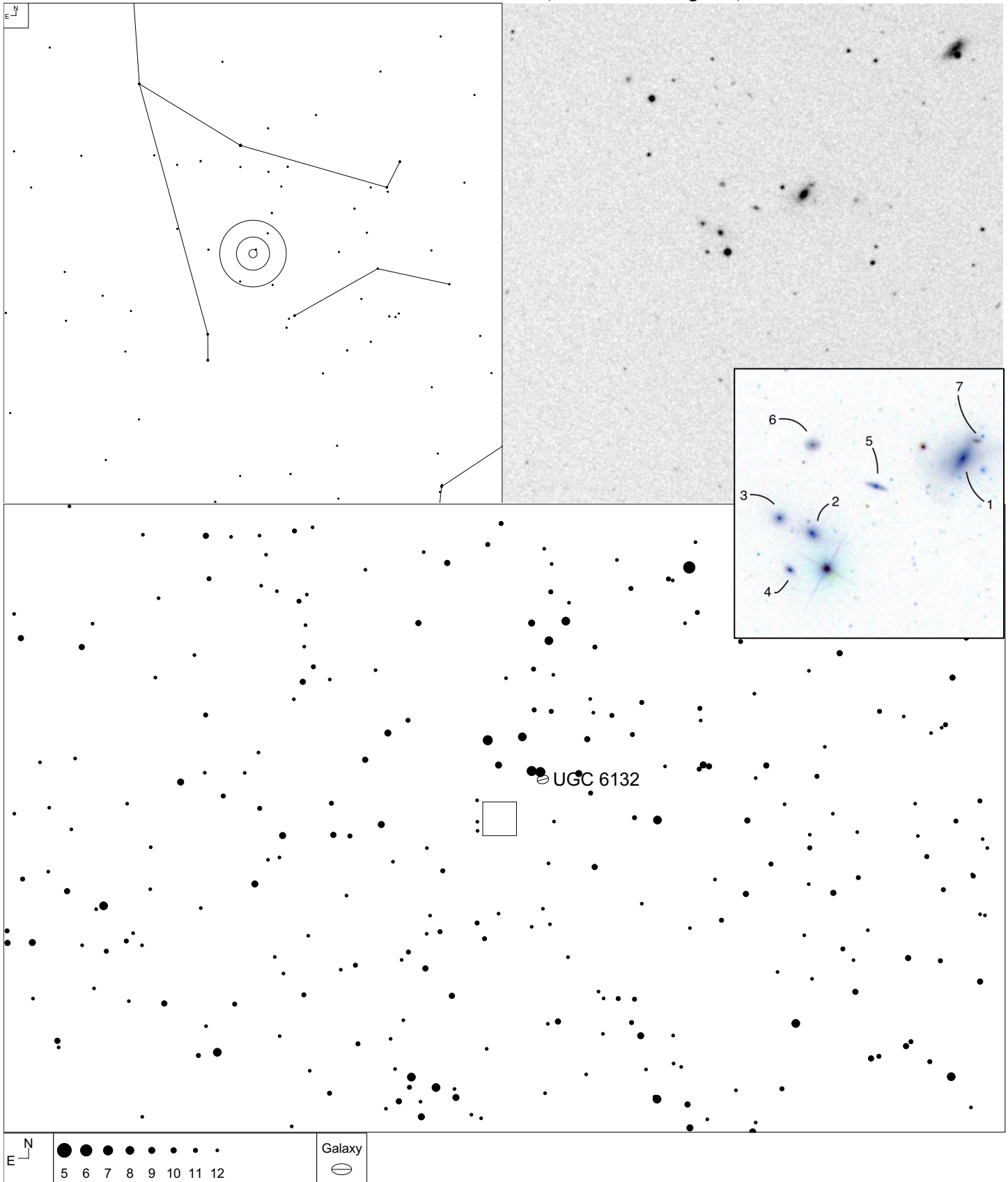
¹ Stoll's paper is not consistent with Shakhbazian's size of 1' and 9 members, so I'm keeping it to the dense chain. The rest are to the NW.

Shakhbazian 120 (Ursa Major)



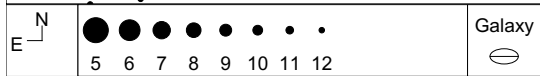
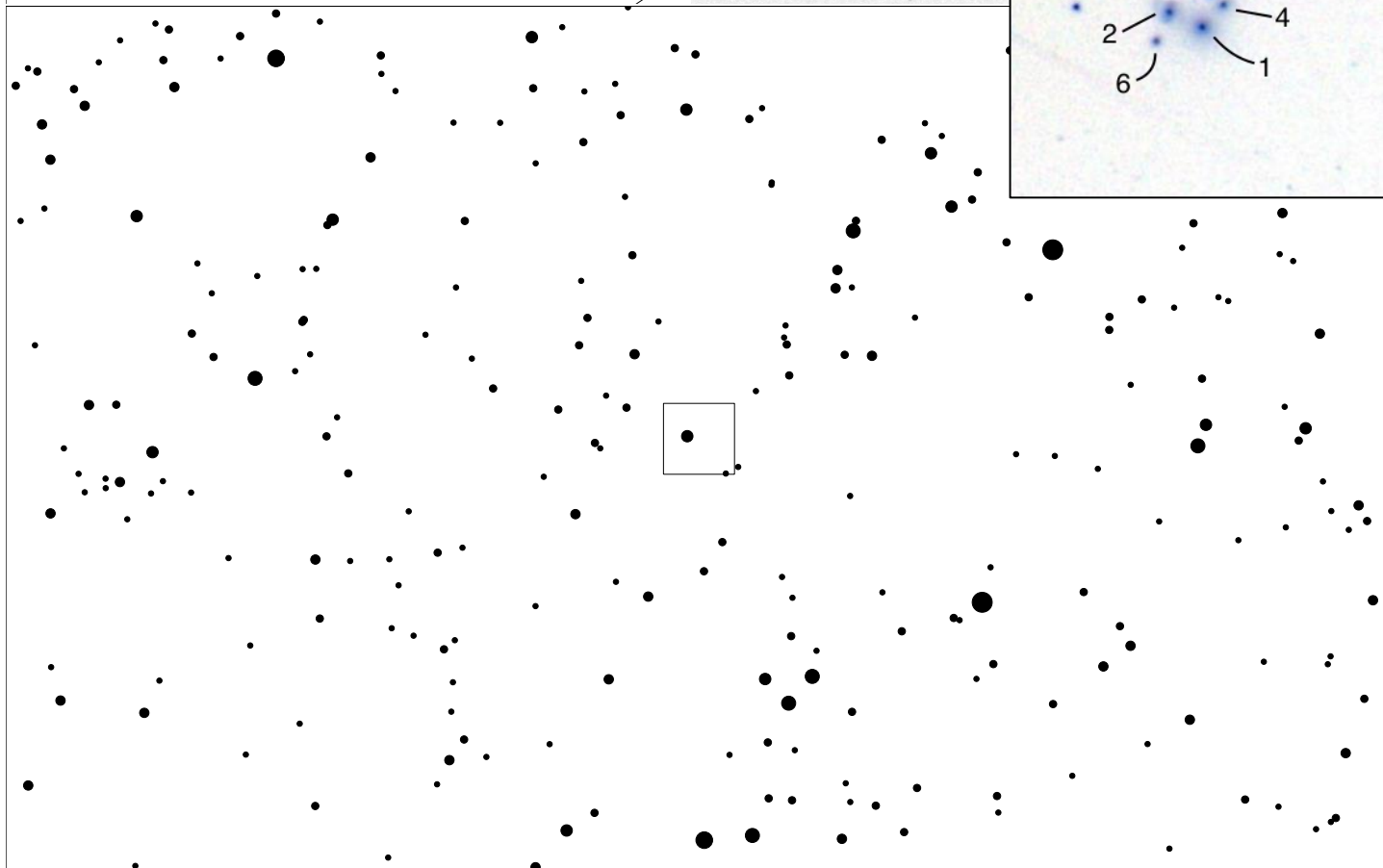
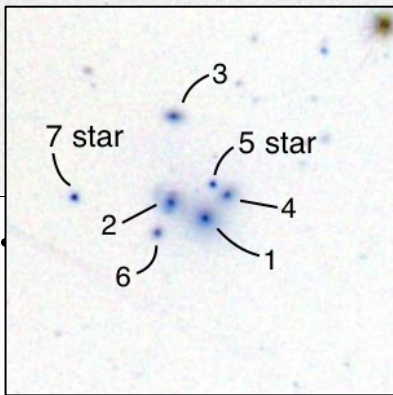
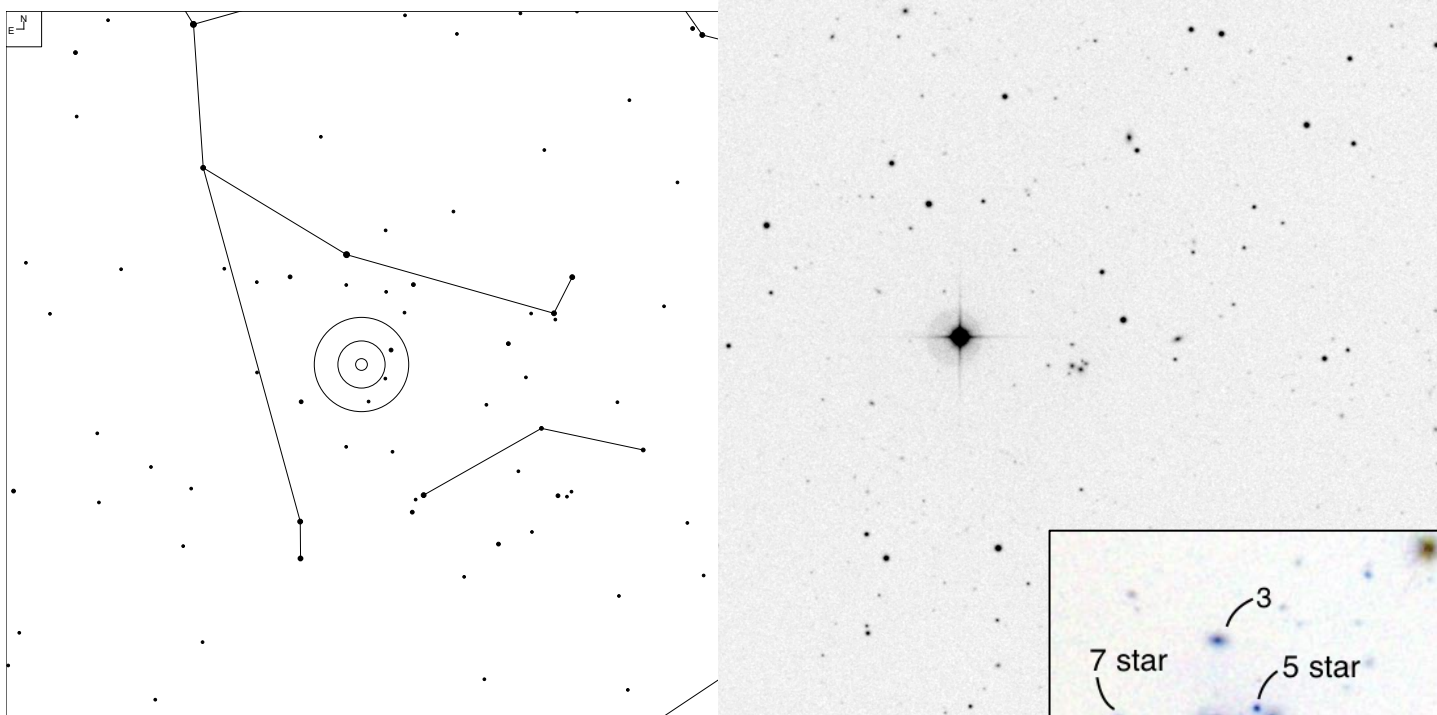
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1151	11 04 28	+35 52 45	10	16.8	1.6'	0.5

Shakhbazian 237 (Ursa Major)



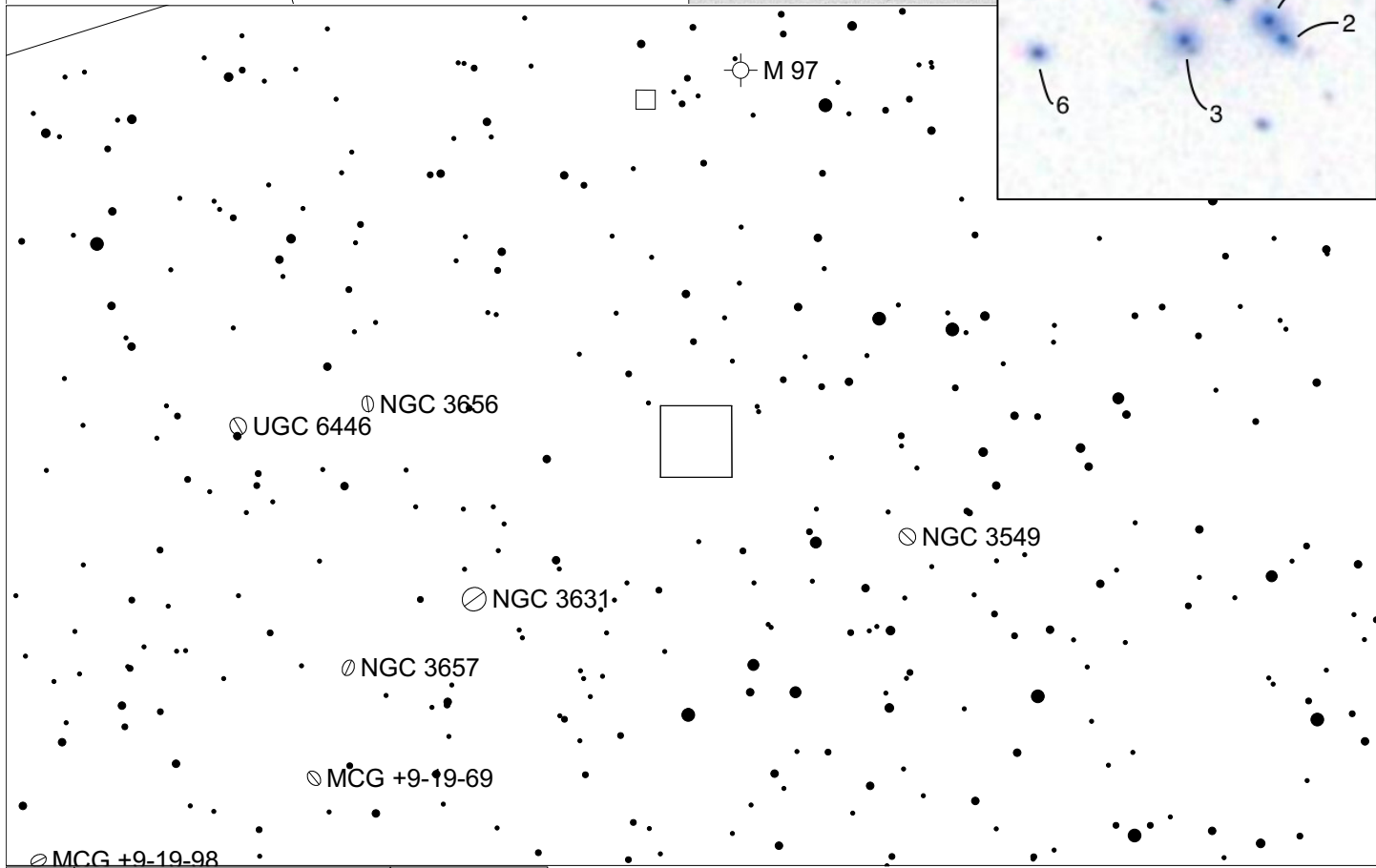
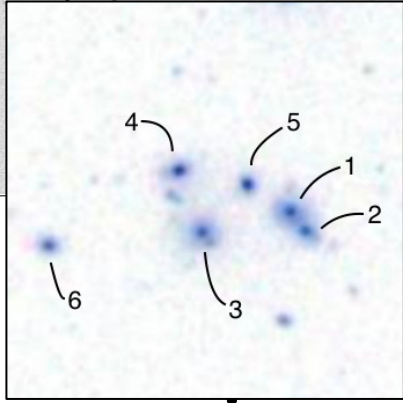
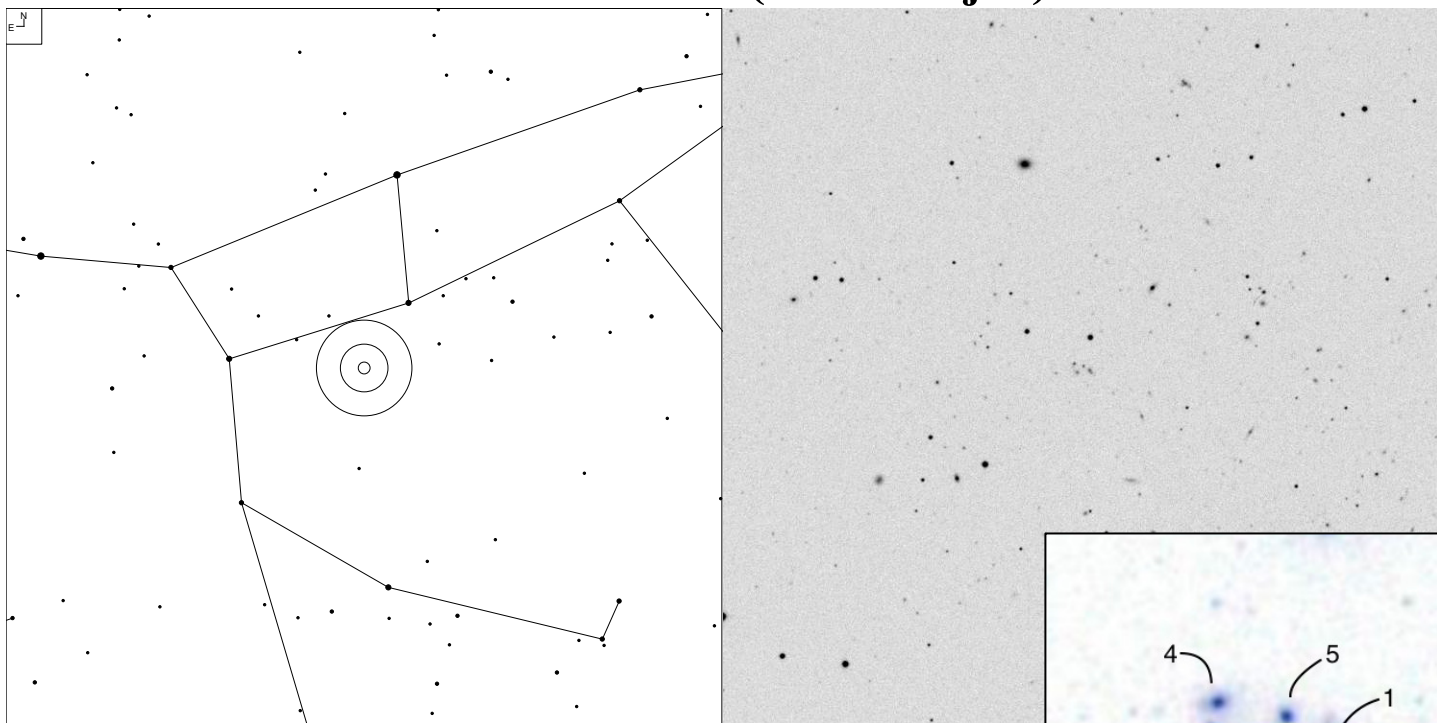
Object	RA	Dec	#	Mag	Size	Cmpt
CGCG 185-3	11 05 28	+37 59 48	7	15.5	2.46'	0.4

Shakhbazian 7 (Ursa Major)



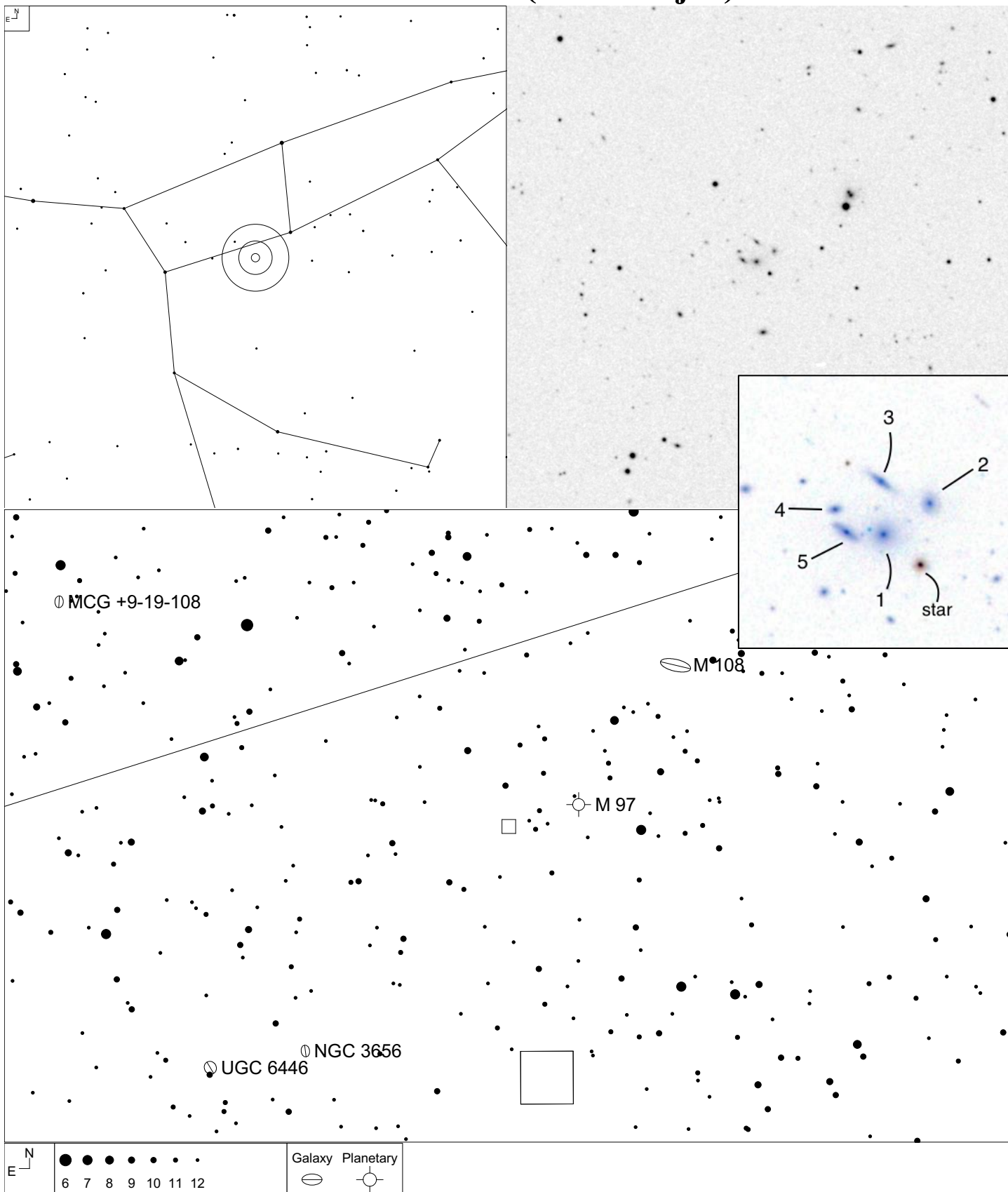
Object	RA	Dec	#	Mag	Size	Cmpt
	11 05 54	+39 47 08	7	17.5	0.8'	0.7

Shakhbazian 3 (Ursa Major)



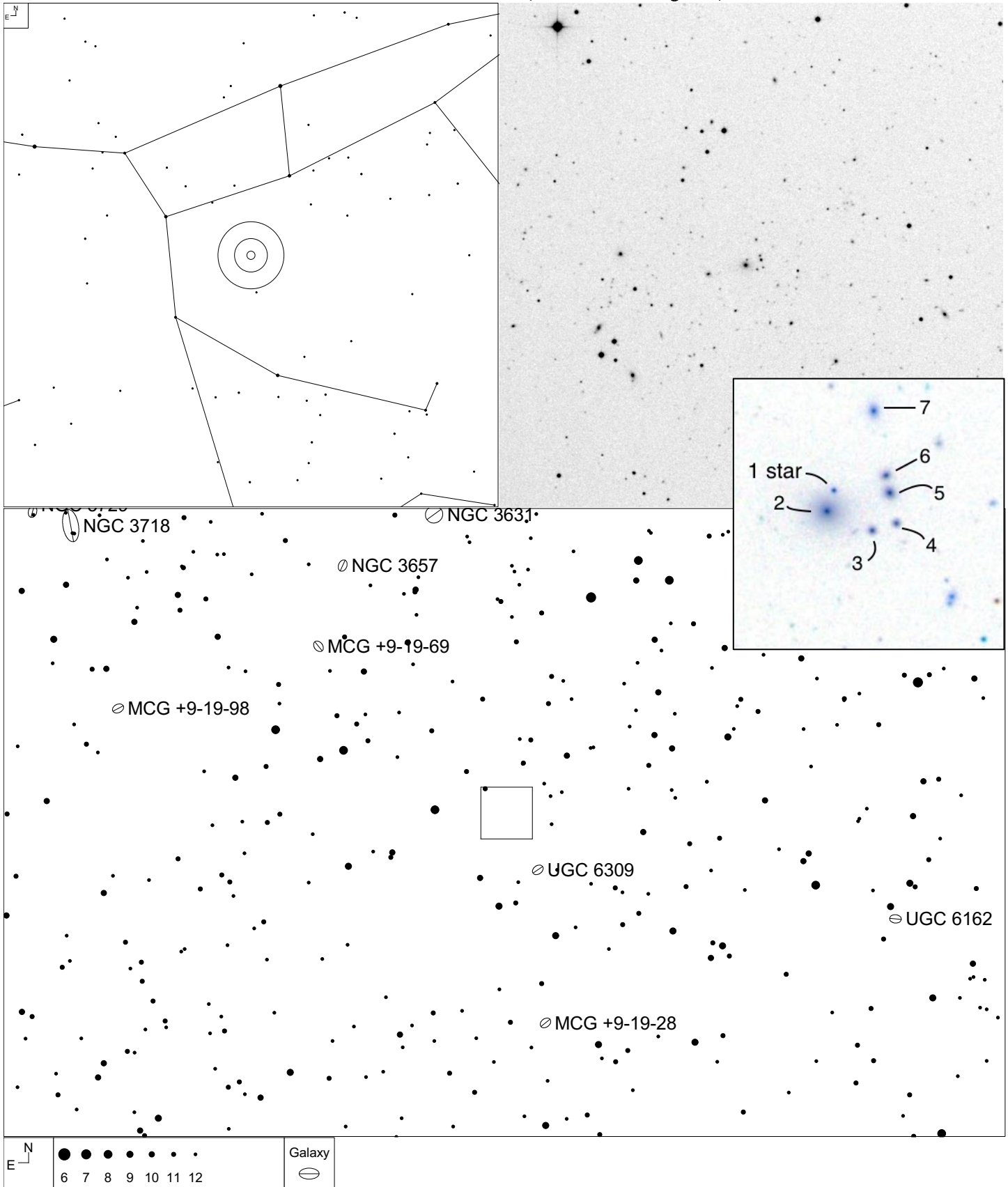
Object	RA	Dec	#	Mag	Size	Cmpt
VV 153	11 15 54	+53 45 10	6	18.9	0.4'	0.4

Shakhbazian 5 (Ursa Major)



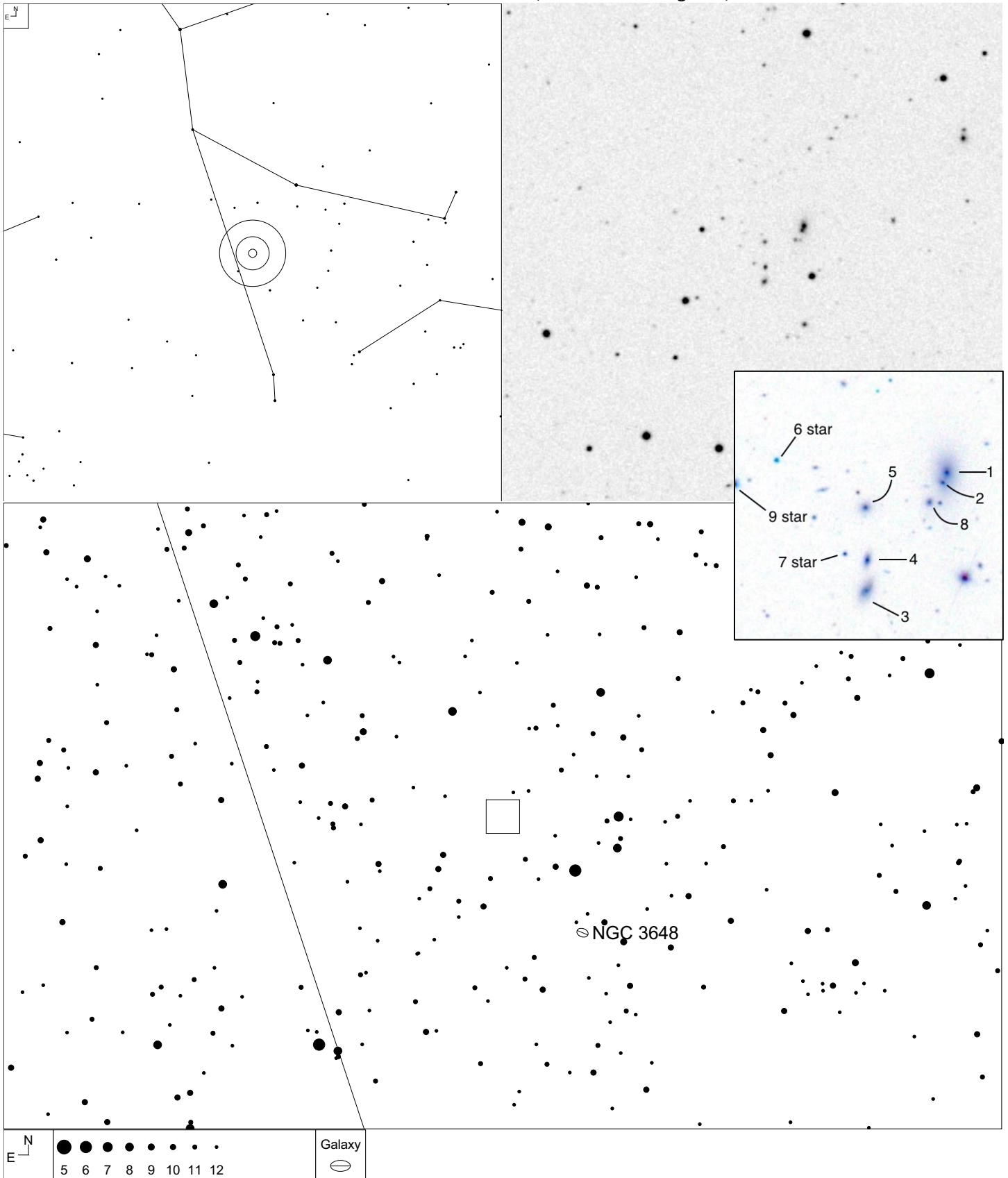
Object	RA	Dec	#	Mag	Size	Cmpt
Hickson 50	11 17 06	+54 55 01	5	18.4	0.7'	1

Shakhbazian 6 (Ursa Major)



Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1218	11 18 48	+51 44 46	7	16.8	0.8'	0.7

Shakhbazian 60 (Ursa Major)

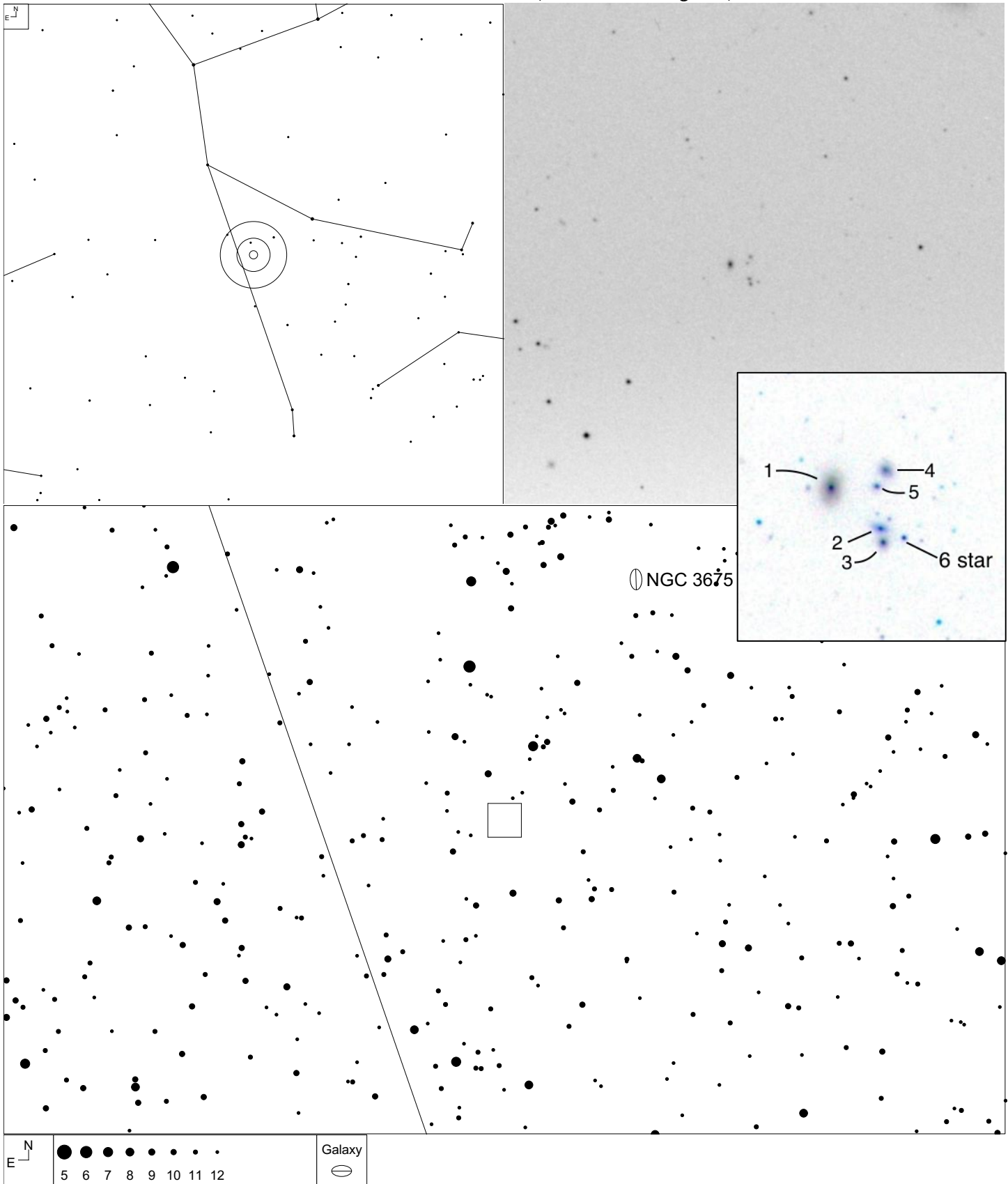


☾ NGC 3648



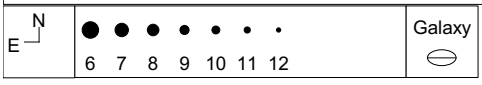
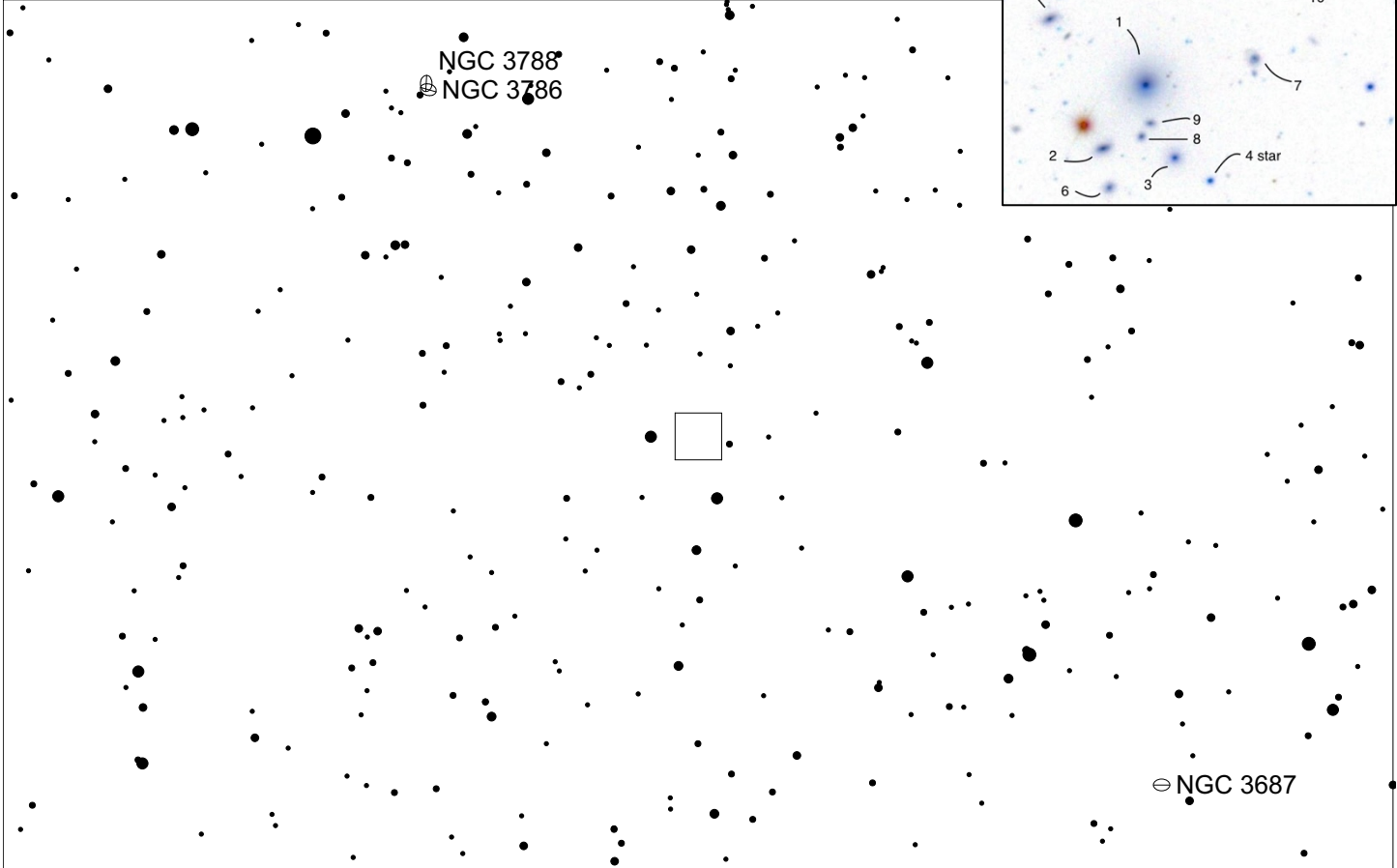
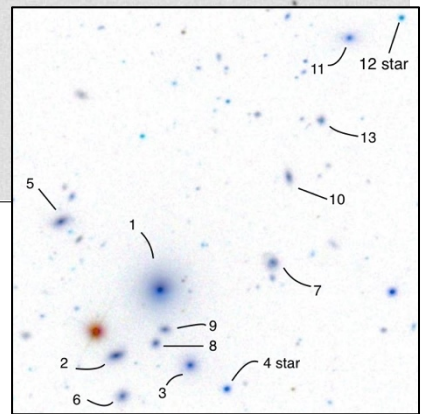
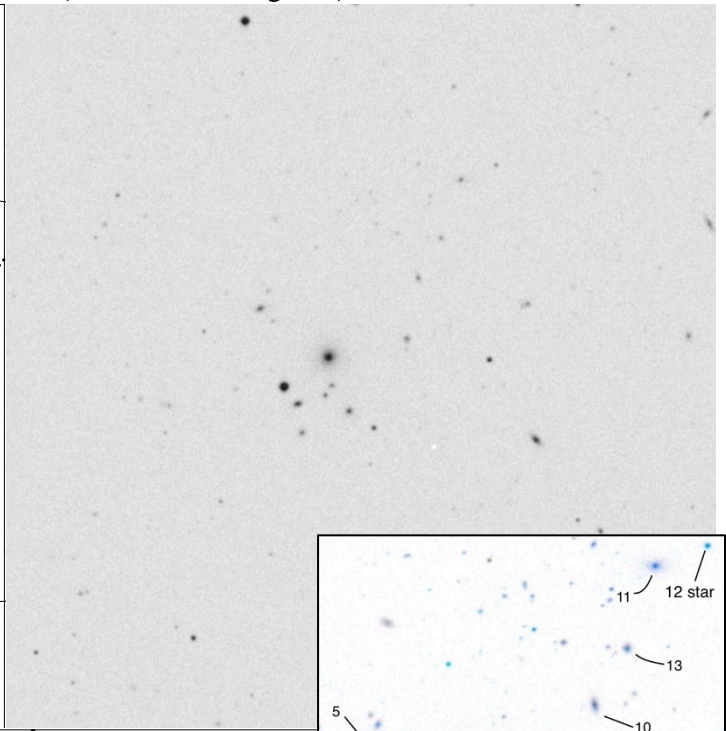
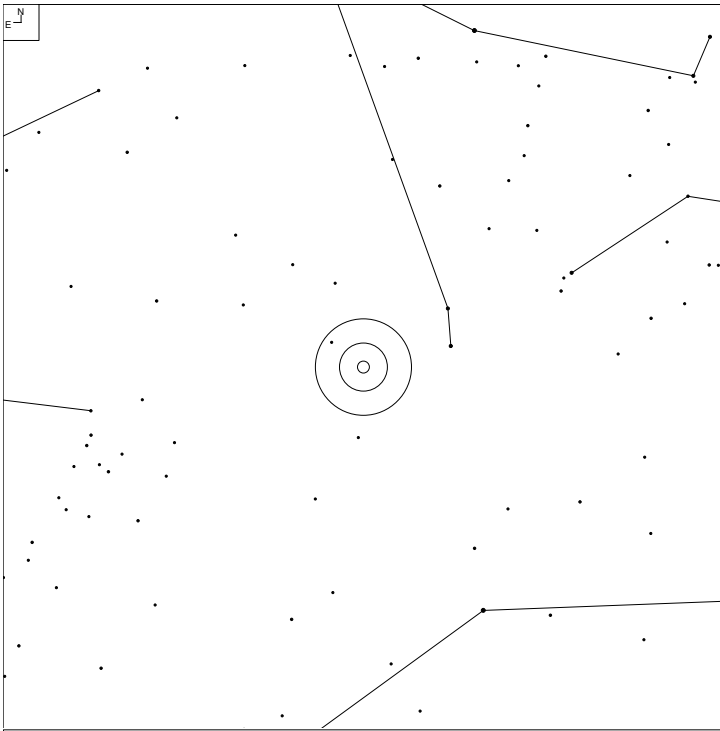
Object	RA	Dec	#	Mag	Size	Cmpt
	11 24 36	+40 25 15	9	17.0	1.6'	0.5

Shakhbazian 63 (Ursa Major)



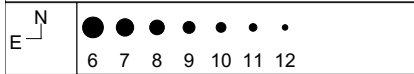
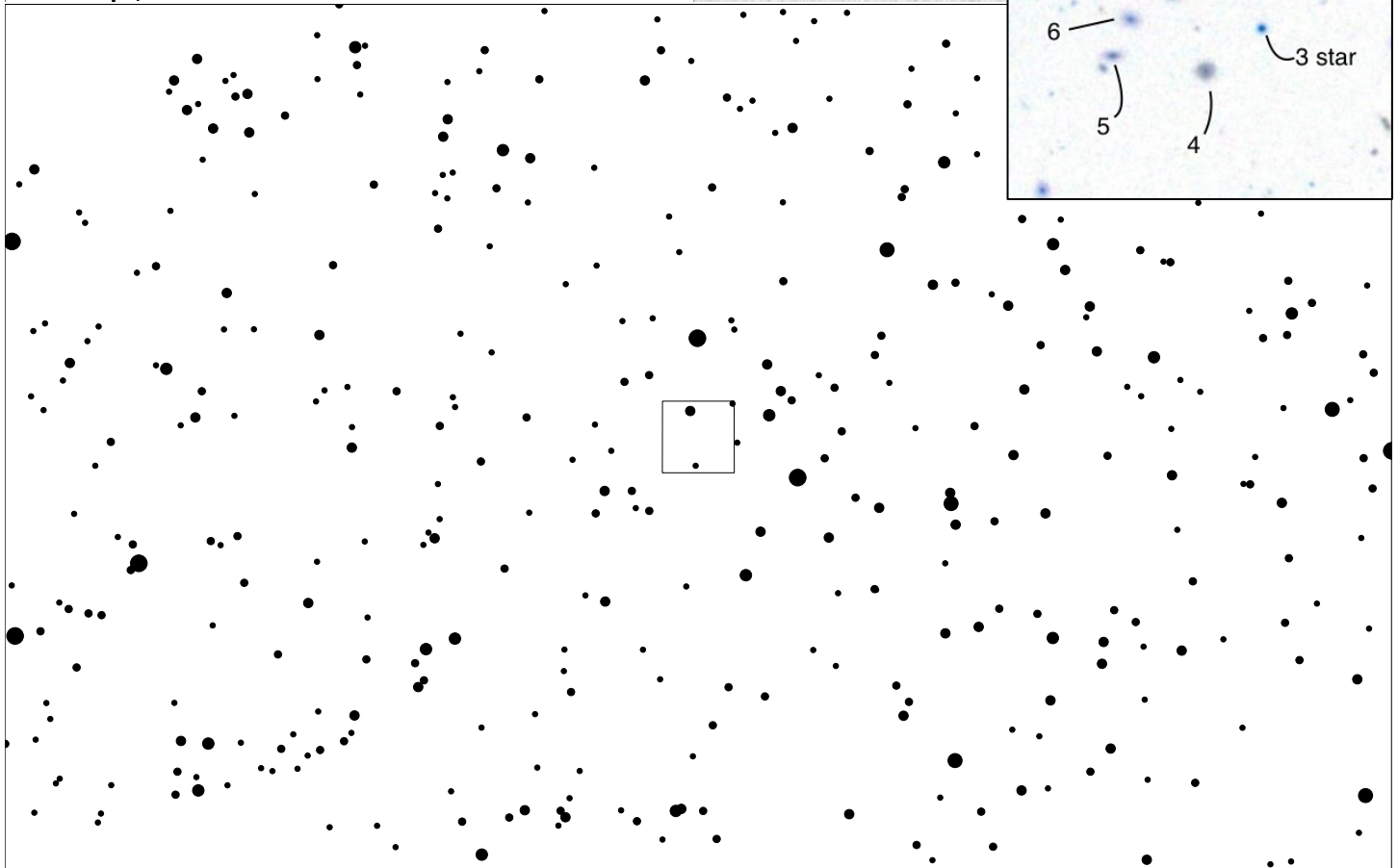
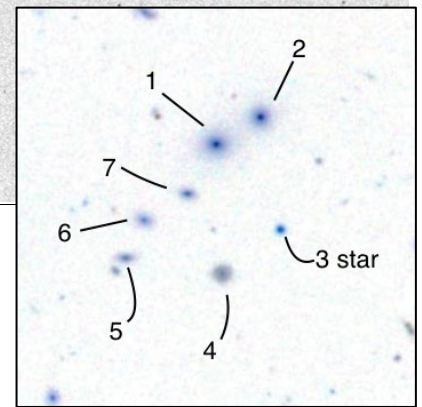
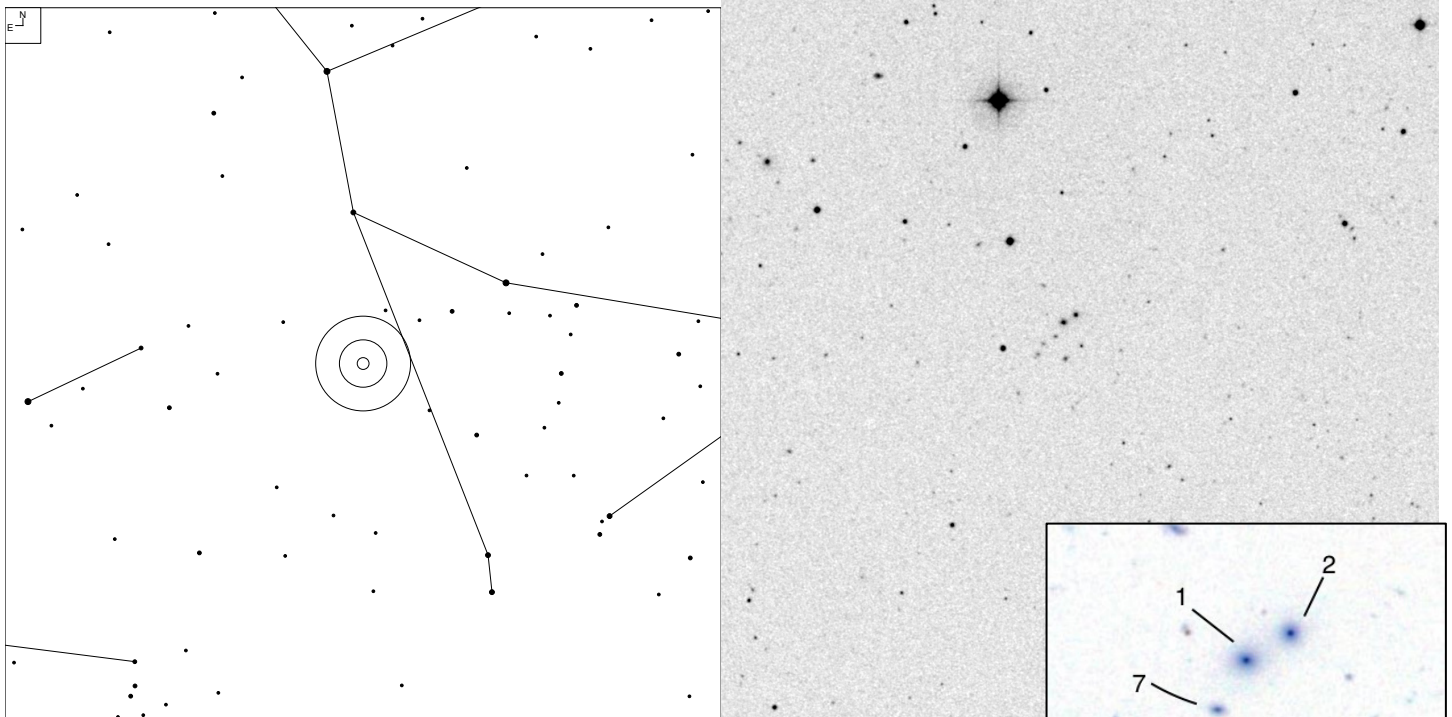
Object	RA	Dec	#	Mag	Size	Cmpt
	11 29 36	+42 26 25	6	16.0	0.9'	0.7

Shakhbazian 199 (Ursa Major)



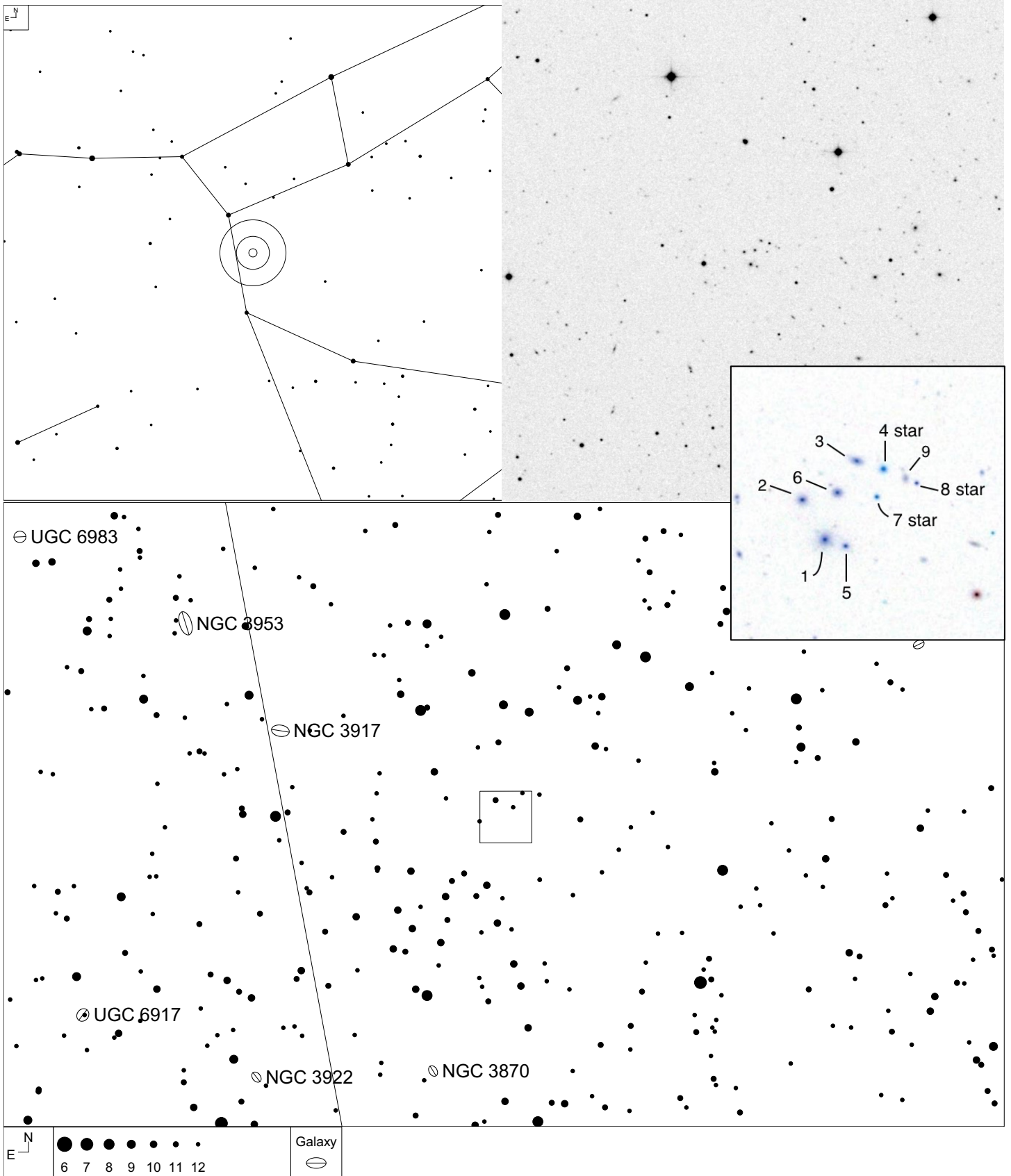
Object	RA	Dec	#	Mag	Size	Cmpt
	11 35 20	+30 43 24	13	16.72*	4.7'	0.3

Shakhbazian 67 (URSA Major)



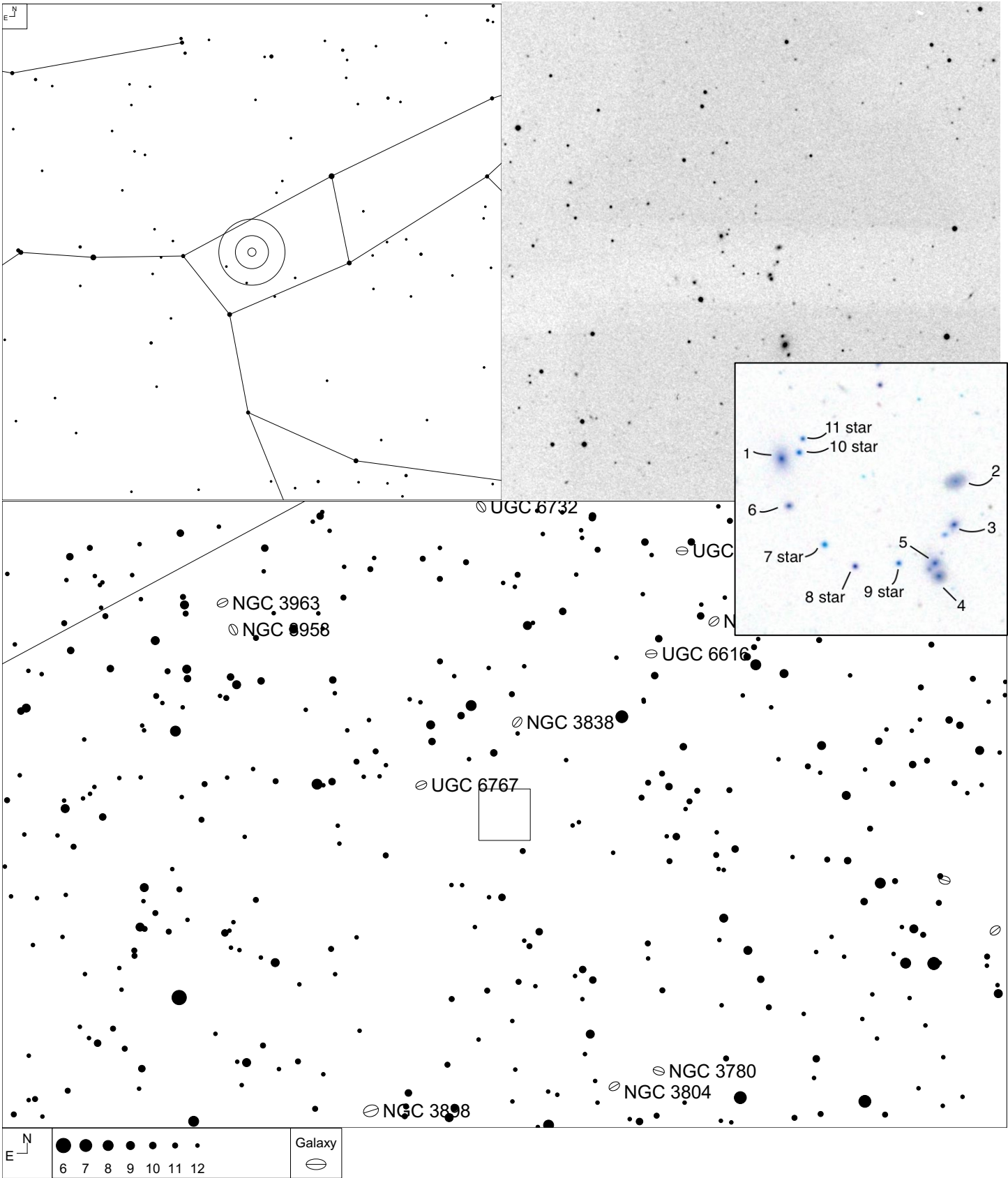
Object	RA	Dec	#	Mag	Size	Cmpt
	11 43 36	+41 22 48	7	16.6	1.3'	0.6

Shakhbazian 2 (Ursa Major)



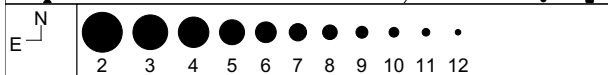
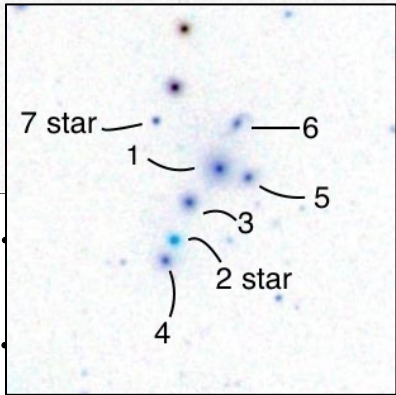
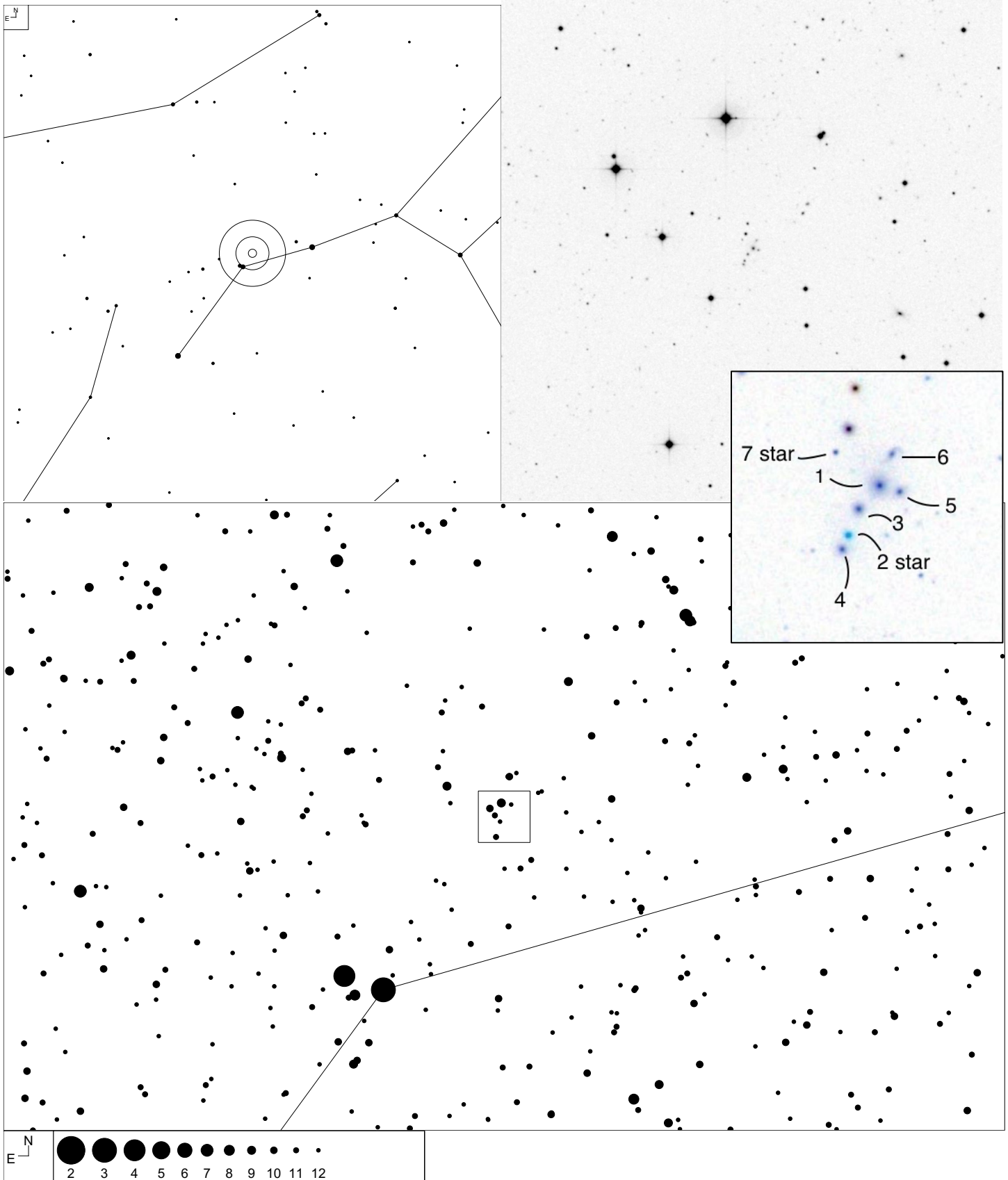
Object	RA	Dec	#	Mag	Size	Cmpt
	11 43 46	+51 25 21	9	18.0	1'	1

Shakhbazian 123 (Ursa Major)



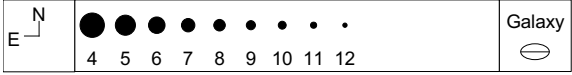
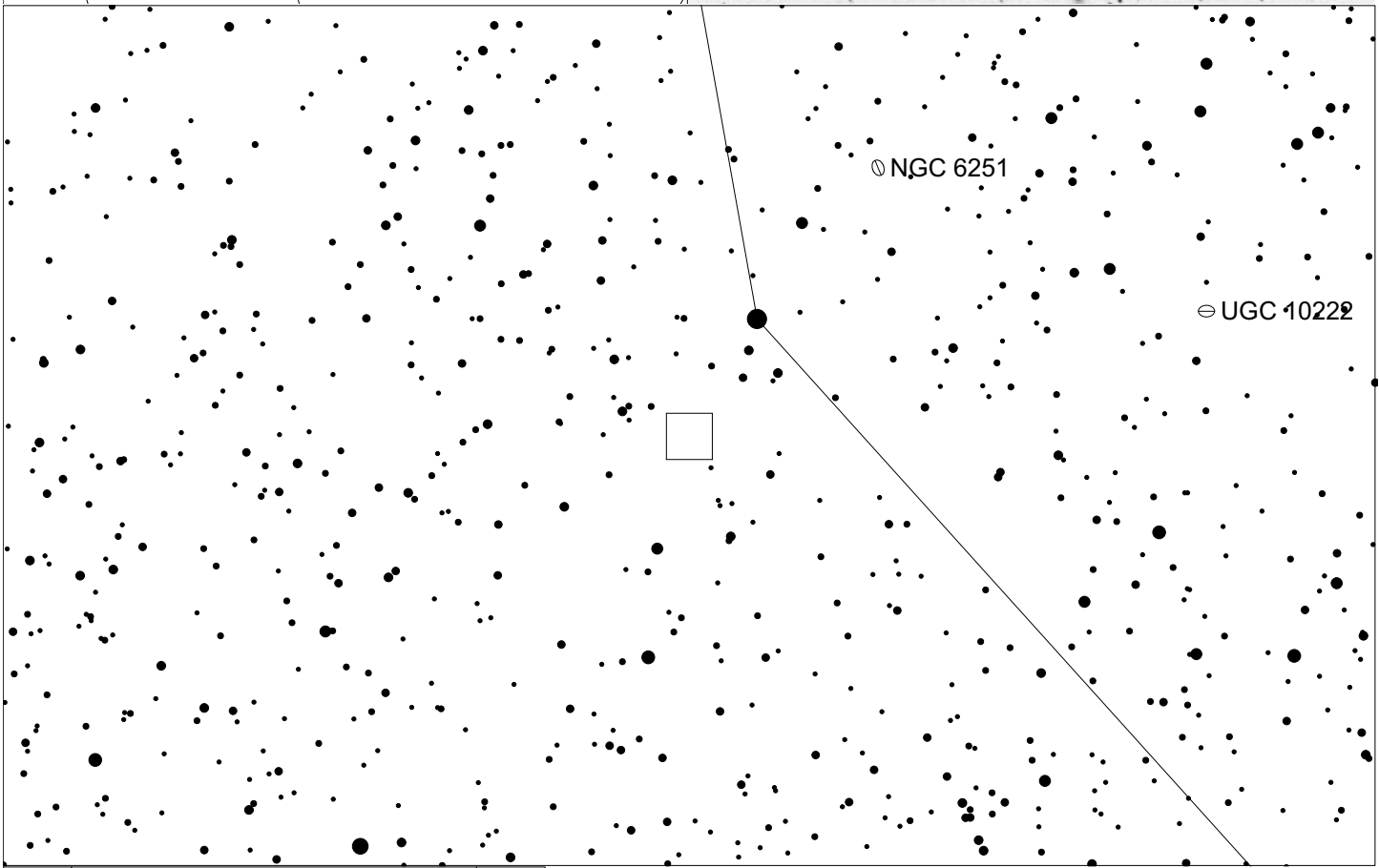
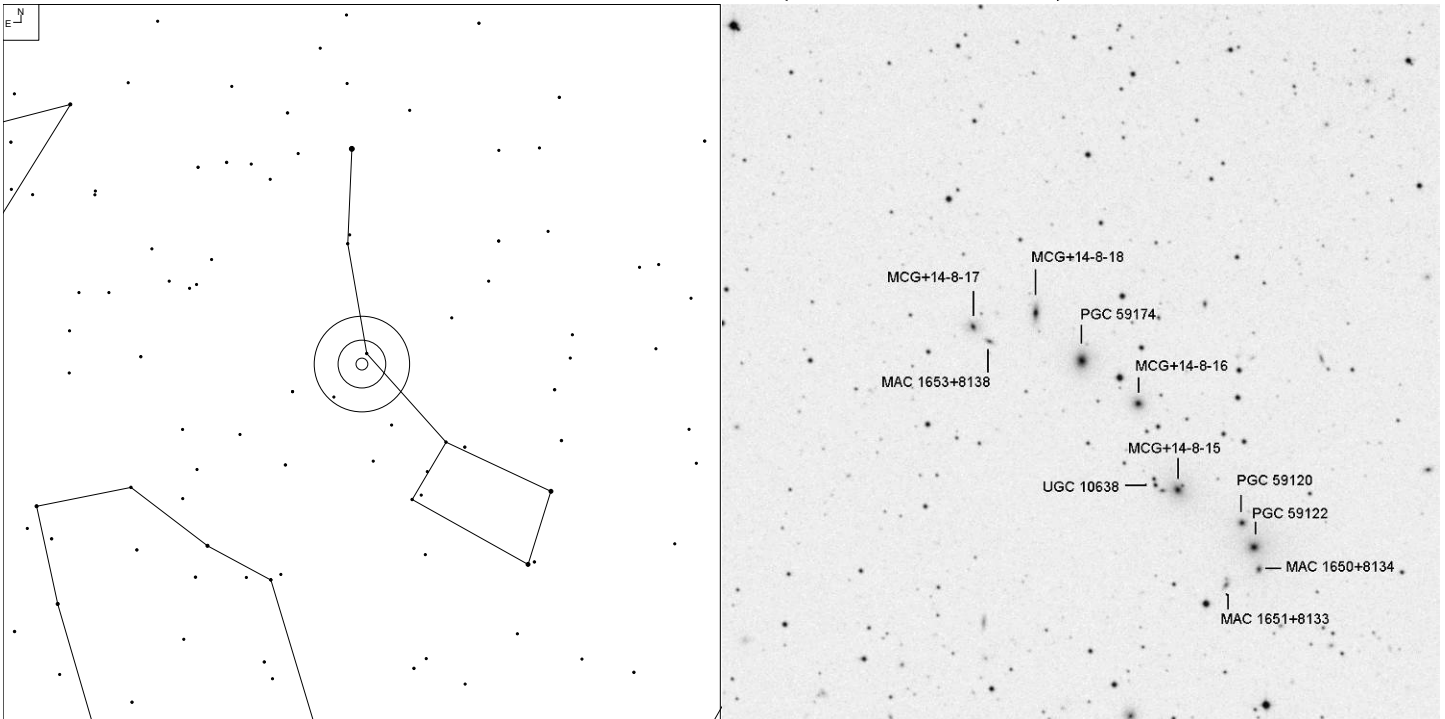
Object	RA	Dec	#	Mag	Size	Cmpt
	11 44 47	+57 31 59	11	16.7	1.9'	0.5

Shakhbazian 128 (Ursa Major)



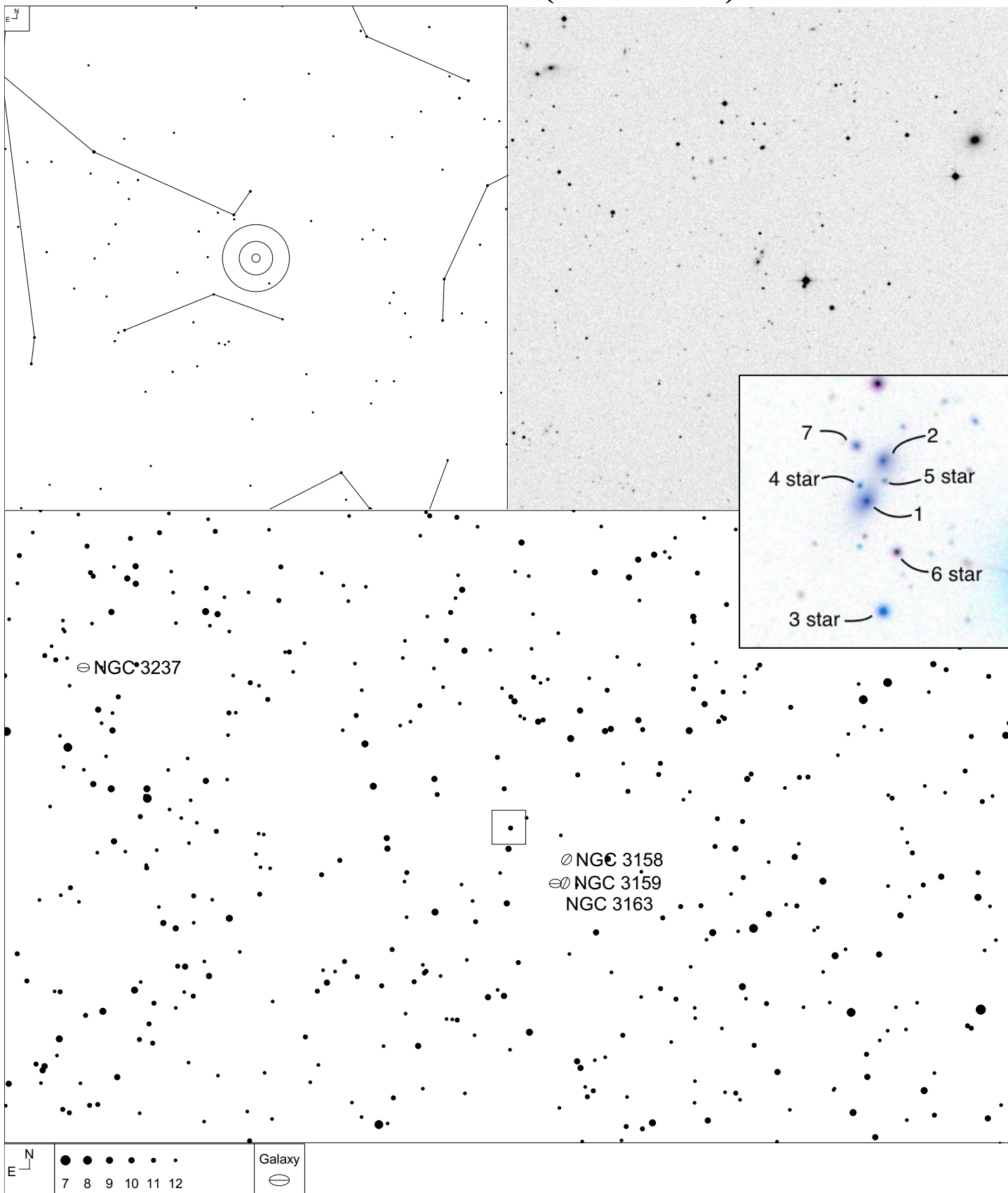
Object	RA	Dec	#	Mag	Size	Cmpt
	13 19 55	+55 45 22	7	17.2	0.8.	0.6

Shakhbazian 166 (Ursa Minor)



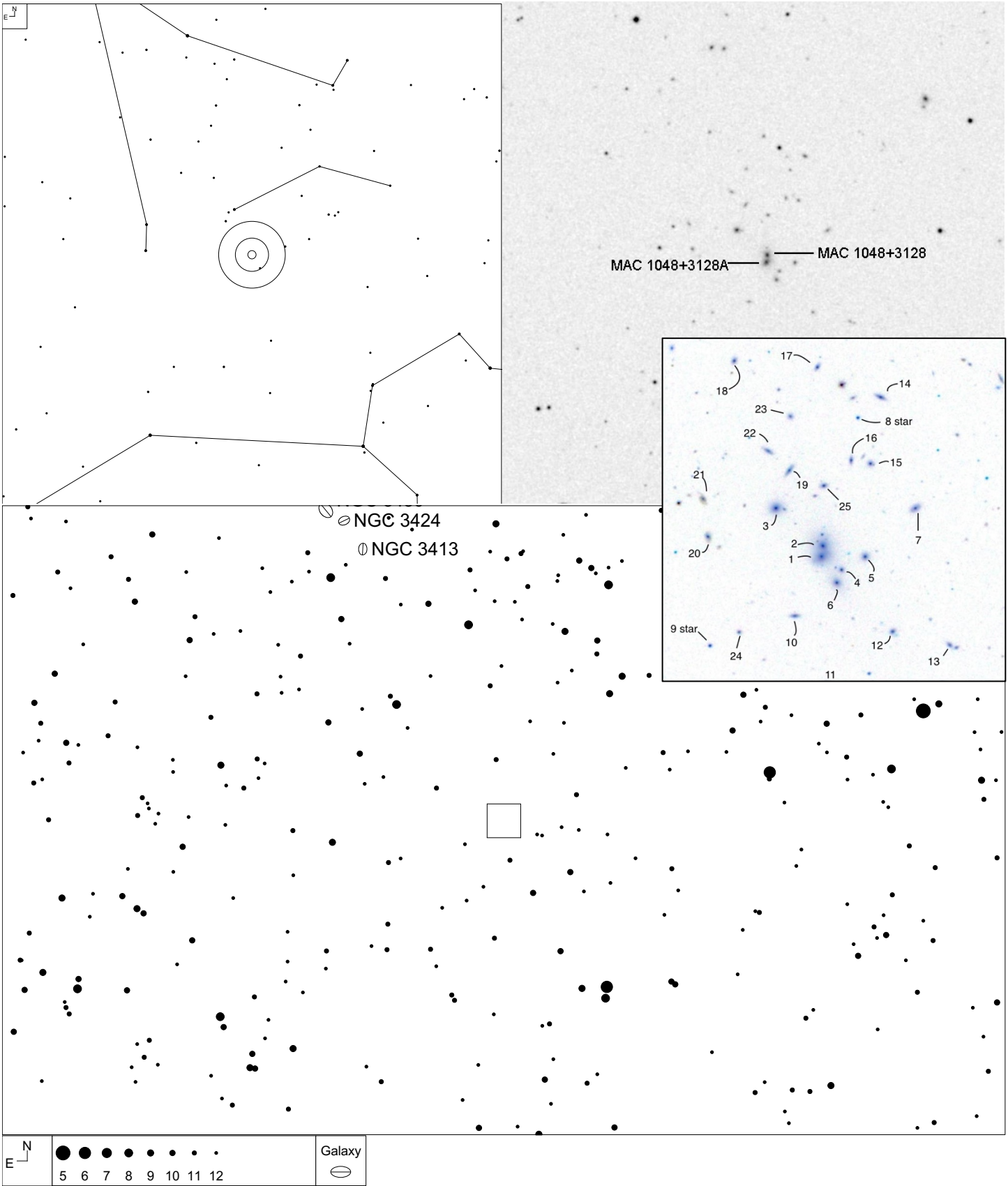
Object	RA	Dec	#	Mag	Size	Cmpt
UGC 10638 (AGC 2247)	16 52 48	+81 37 54	10	14.88*	7.9'	0.5

Shakhbazian 49 (Leo Minor)



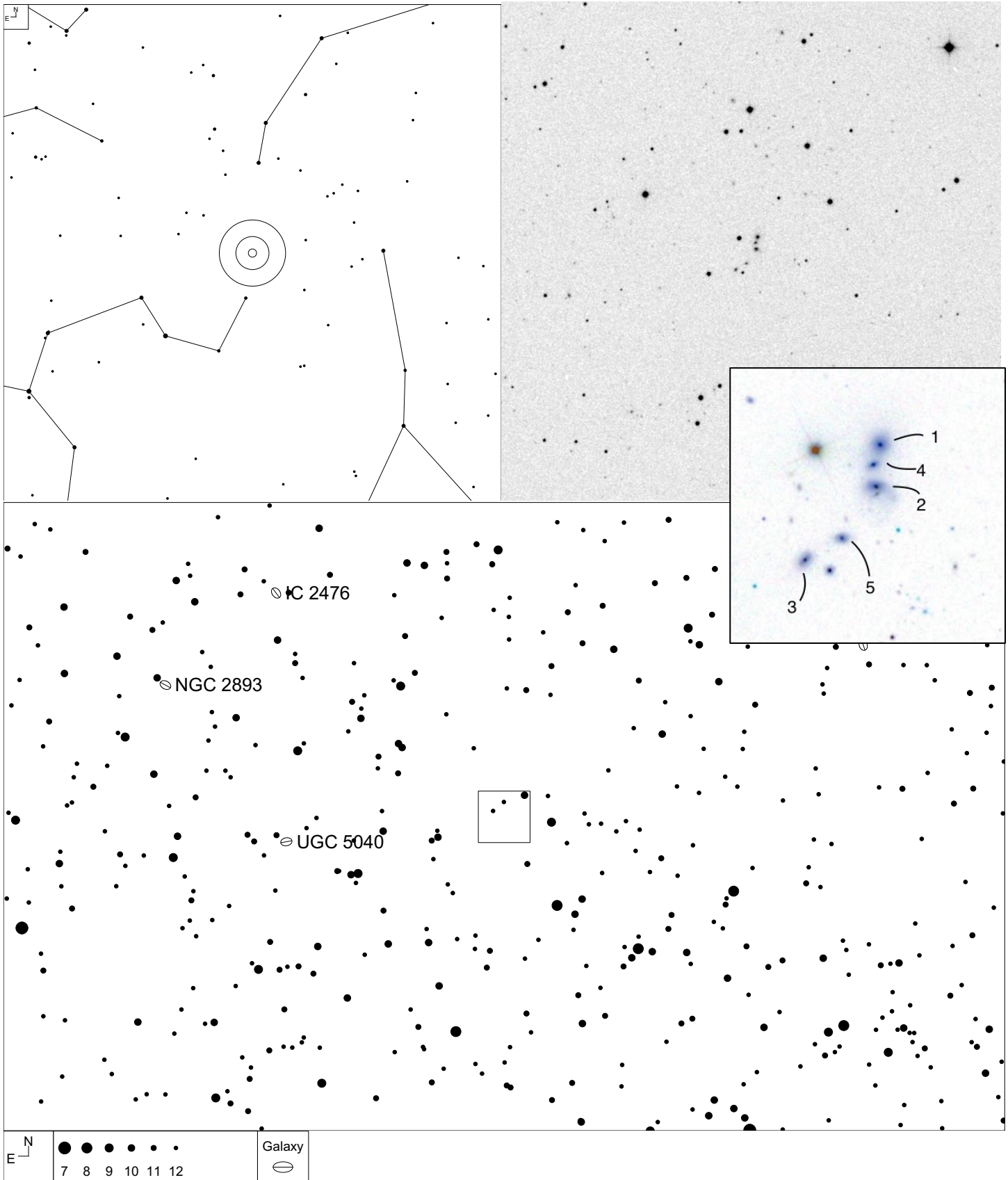
Object	RA	Dec	#	Mag	Size	Cmpt
MAC 1015+3855	10 15 15	+38 55 12	7	16.8	1.2'	0.5

Shakhbazian 191 (Leo Minor)



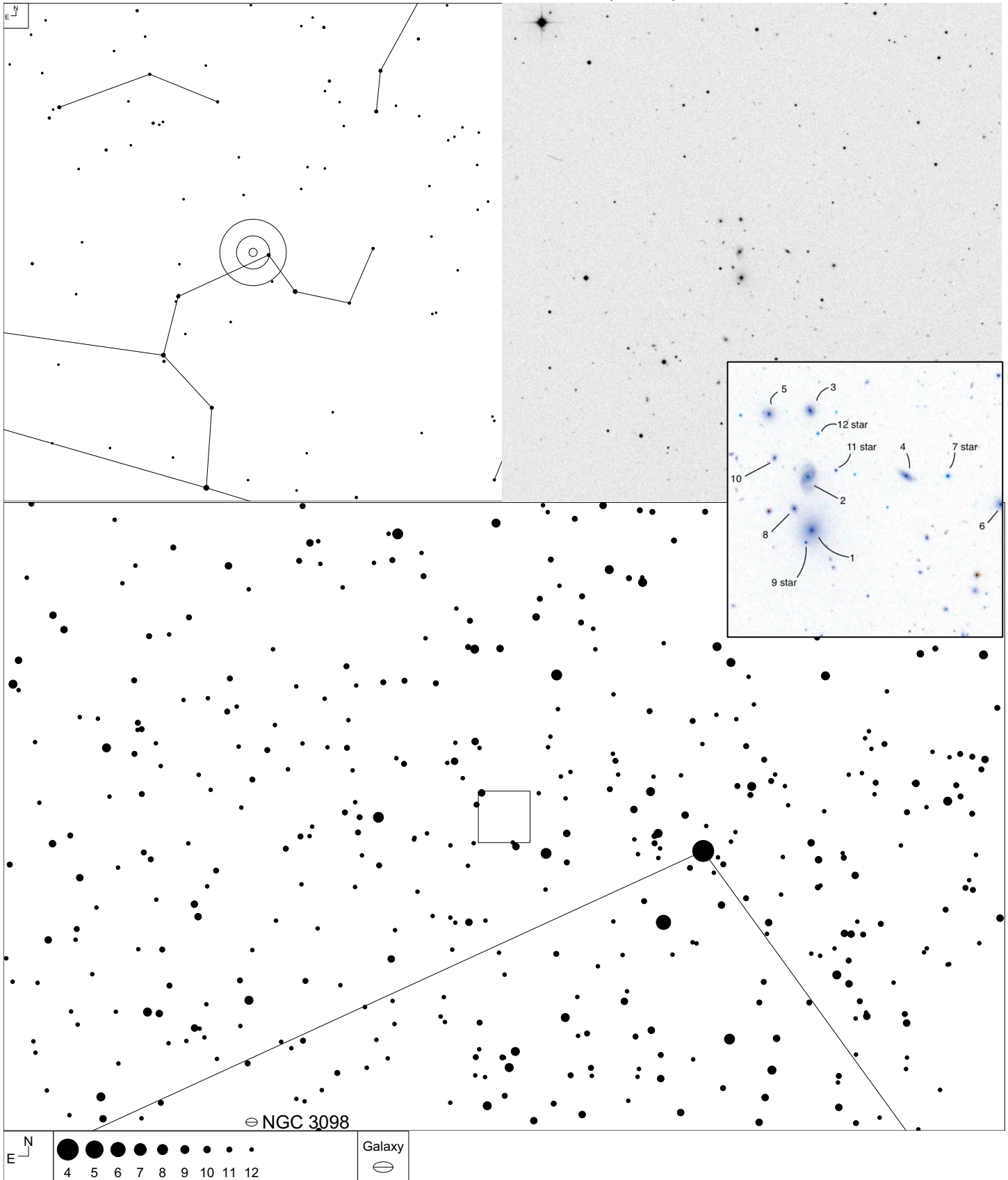
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1097	10 48 09	+31 28 22	25	15.2	3.9'	0.6

Shakhbazian 186 (Leo)



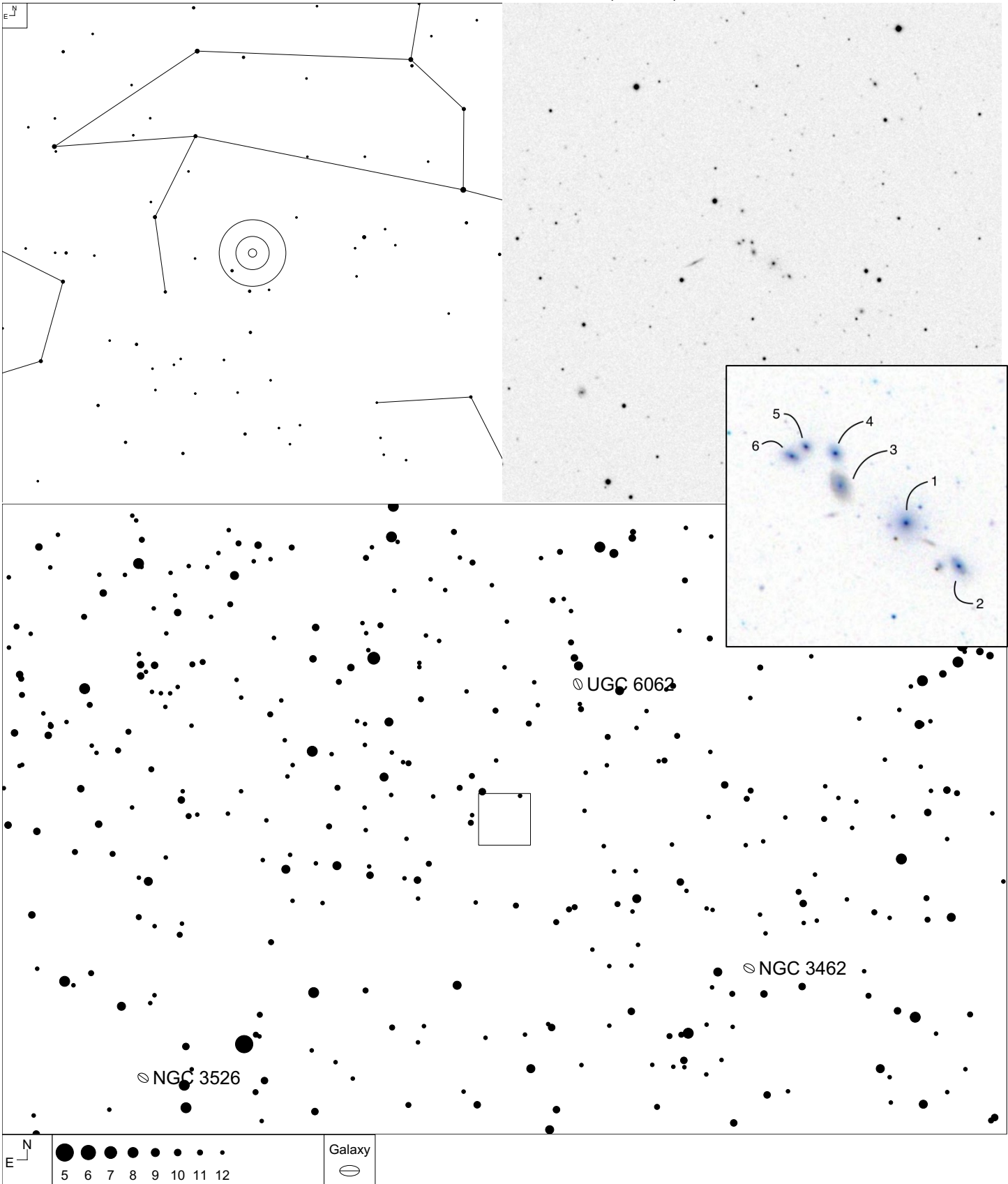
Object	RA	Dec	#	Mag	Size	Cmpt
	09 22 52	+28 55 25	5	16.9	1.1'	0.6

Shakhbazian 188 (Leo)



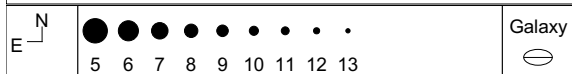
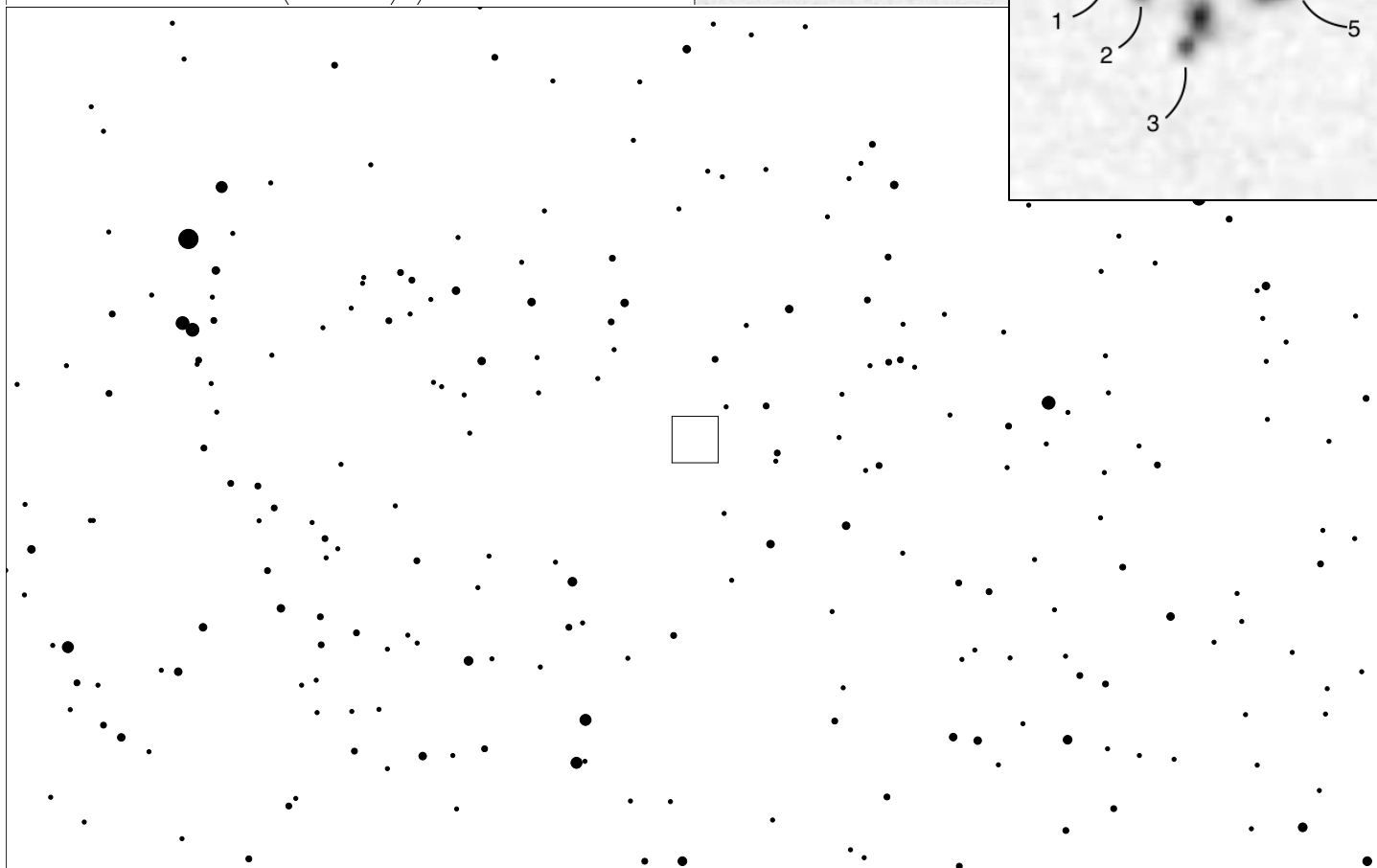
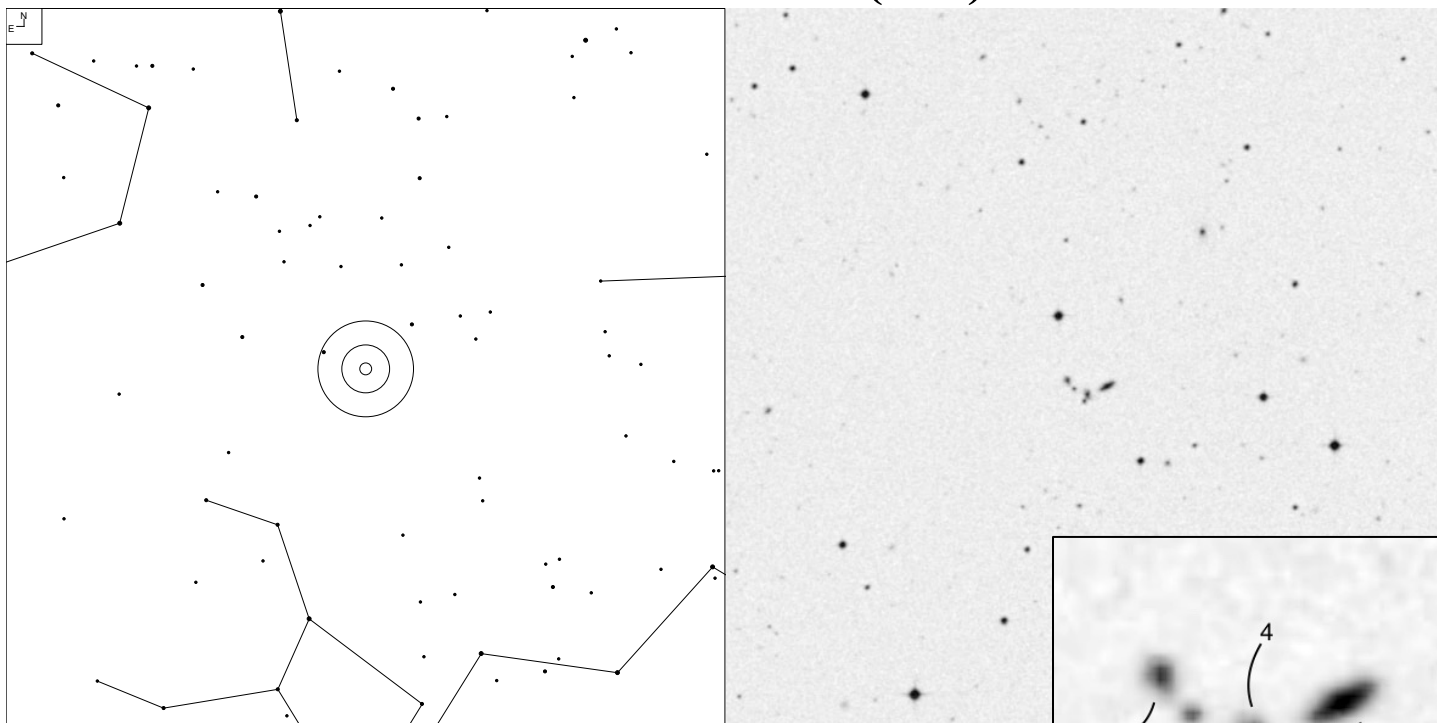
Object	RA	Dec	#	Mag	Size	Cmpt
	09 56 59	+26 10 27	12	16.2	3.4'	0.3

Shakhbazian 350 (Leo)



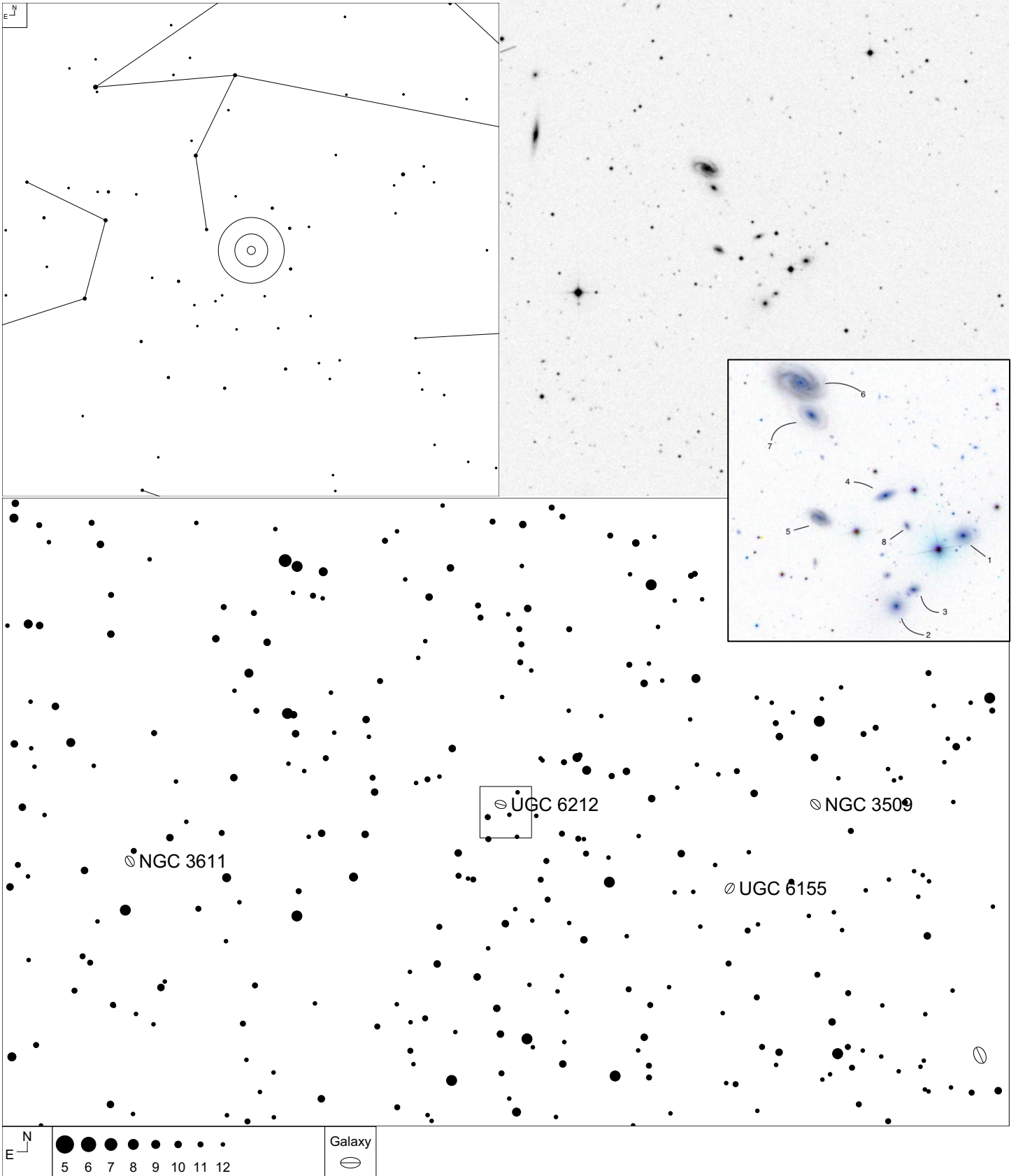
Object	RA	Dec	#	Mag	Size	Cmpt
	11 00 02	+08 24 26	6	17.04	1.9	0.5

Shakhbazian 318 (Leo)



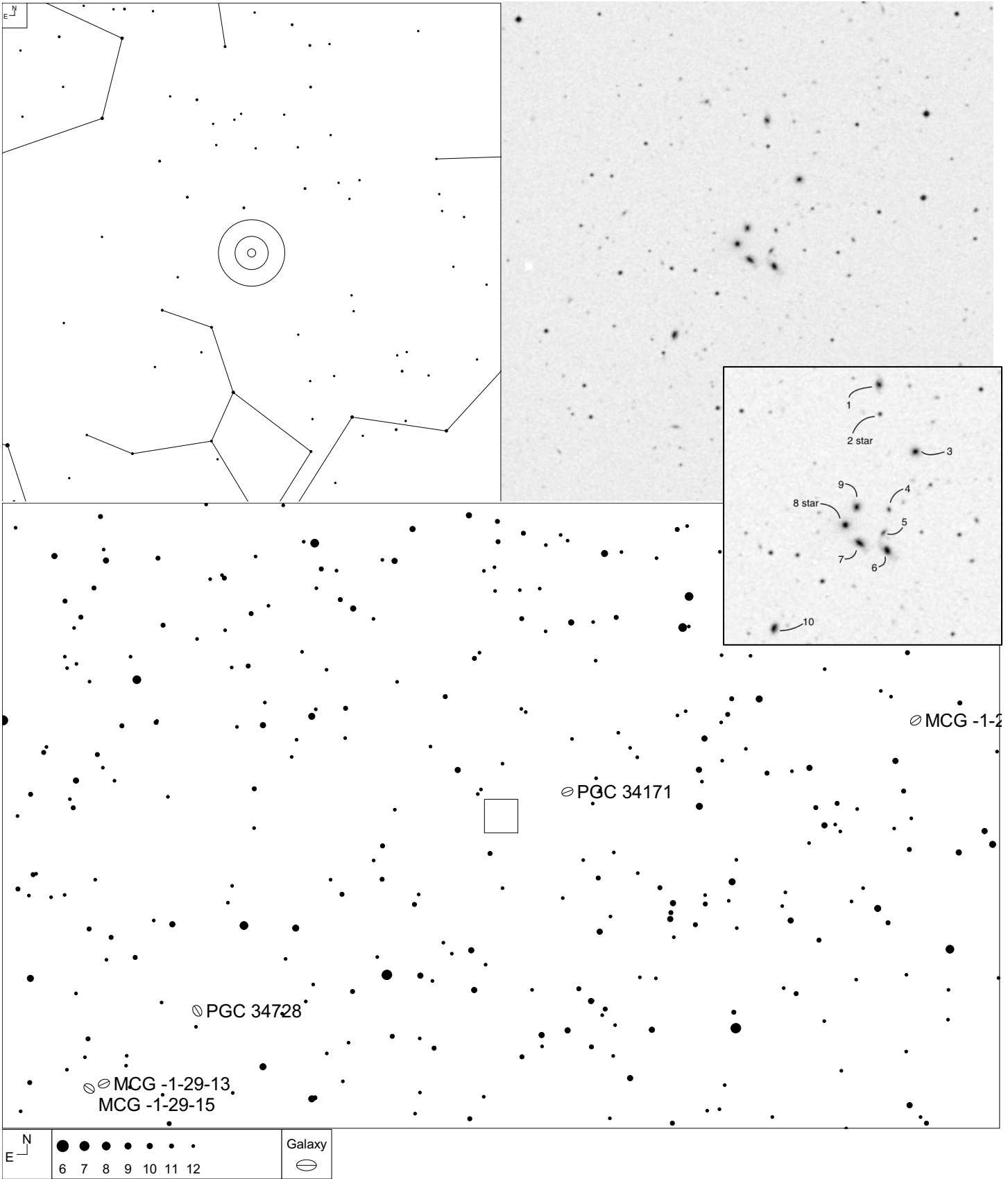
Object	RA	Dec	#	Mag	Size	Cmpt
	11 09 37	-04 20 58	5	17.64*	0.6'	0.6

Shakhbazian 351 (Leo)



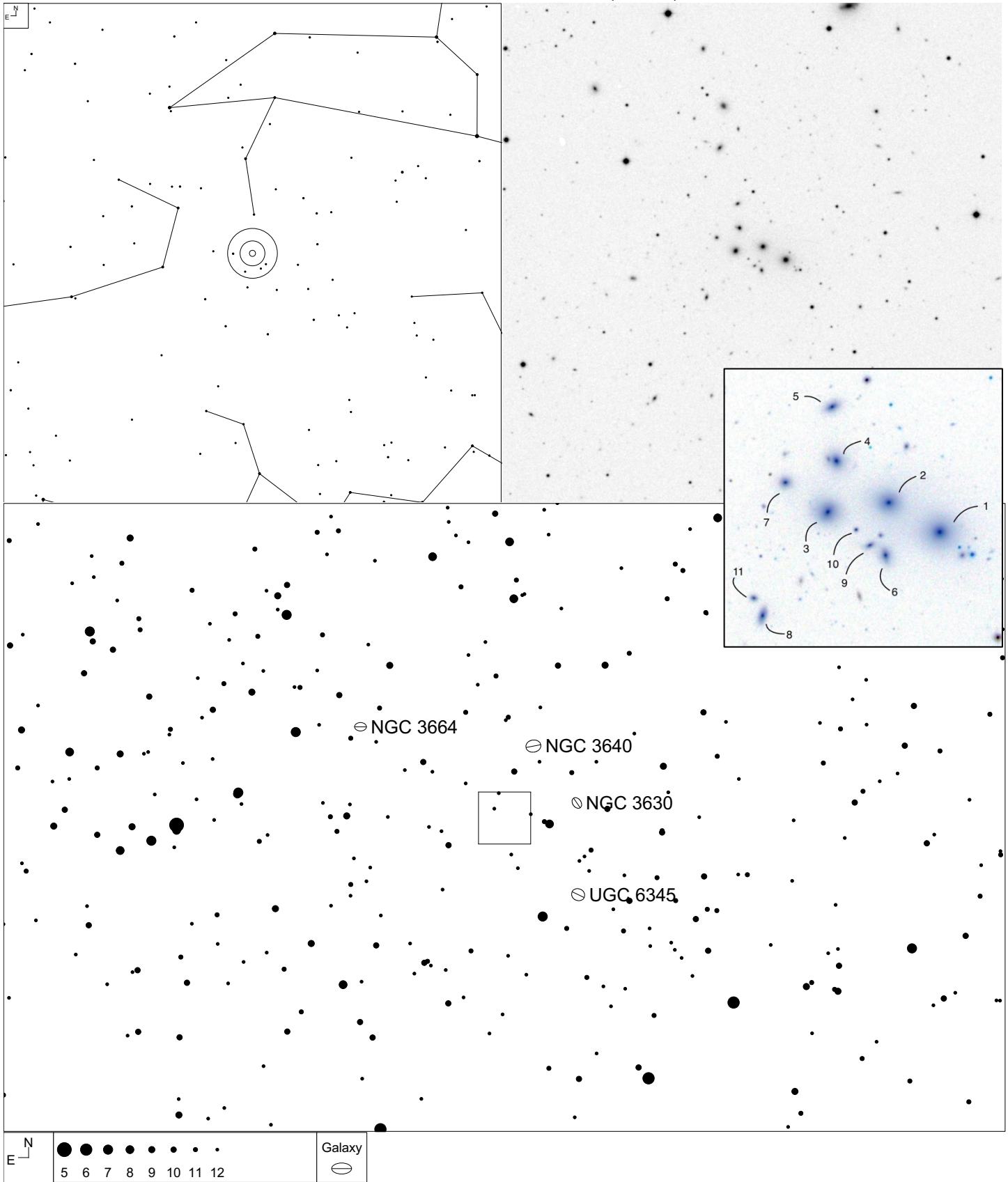
Object	RA	Dec	#	Mag	Size	Cmpt
	11 10 19	+04 47 32	8	15.8	2.5'	0.5

Shakhbazian 320 (Leo)



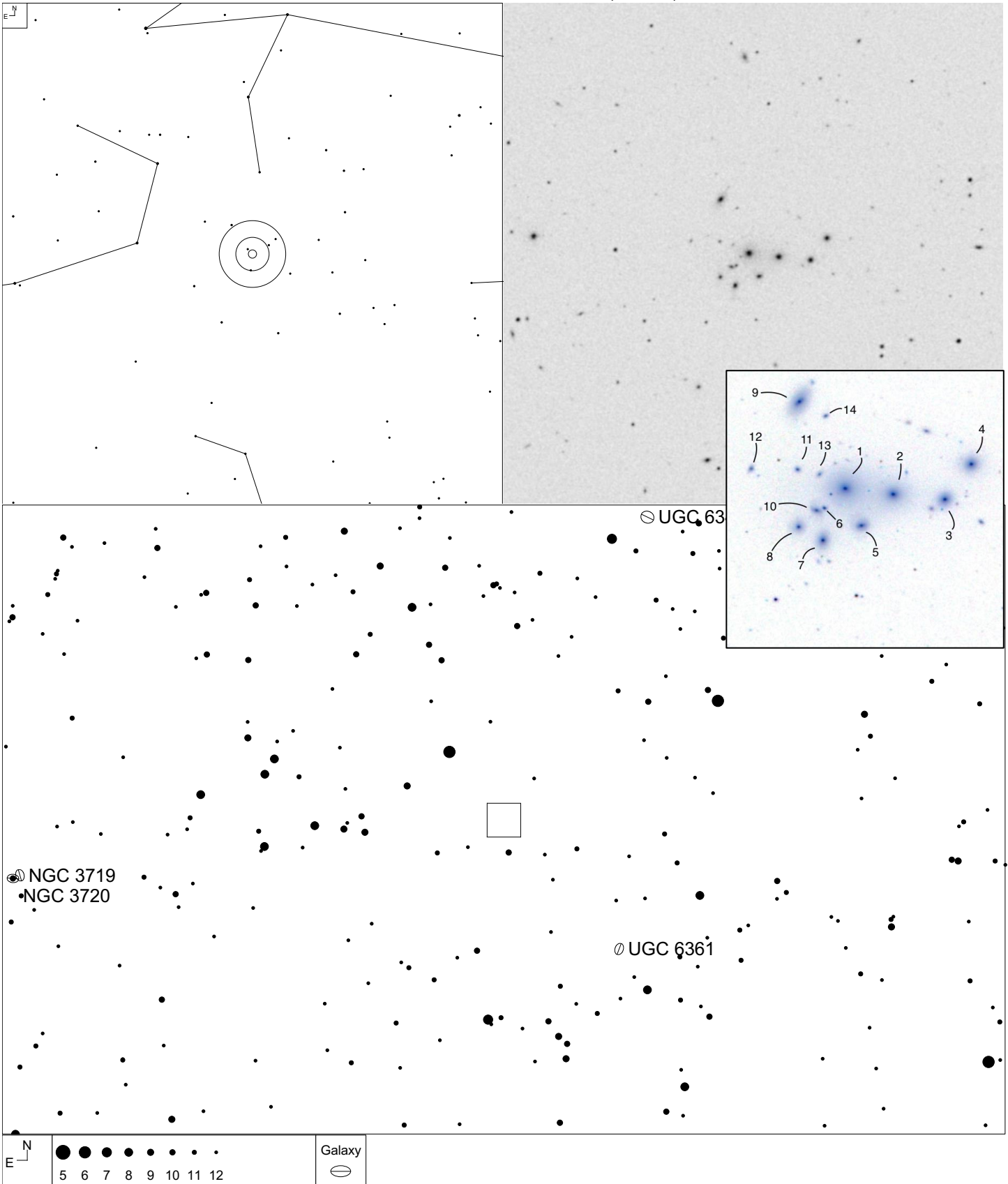
Object	RA	Dec	#	Mag	Size	Cmpt
	11 14 46	-06 22 28	10	17.37*	4.7'	0.2

Shakhbazian 352 (Leo)



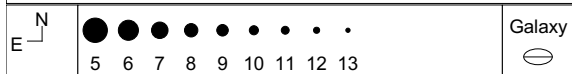
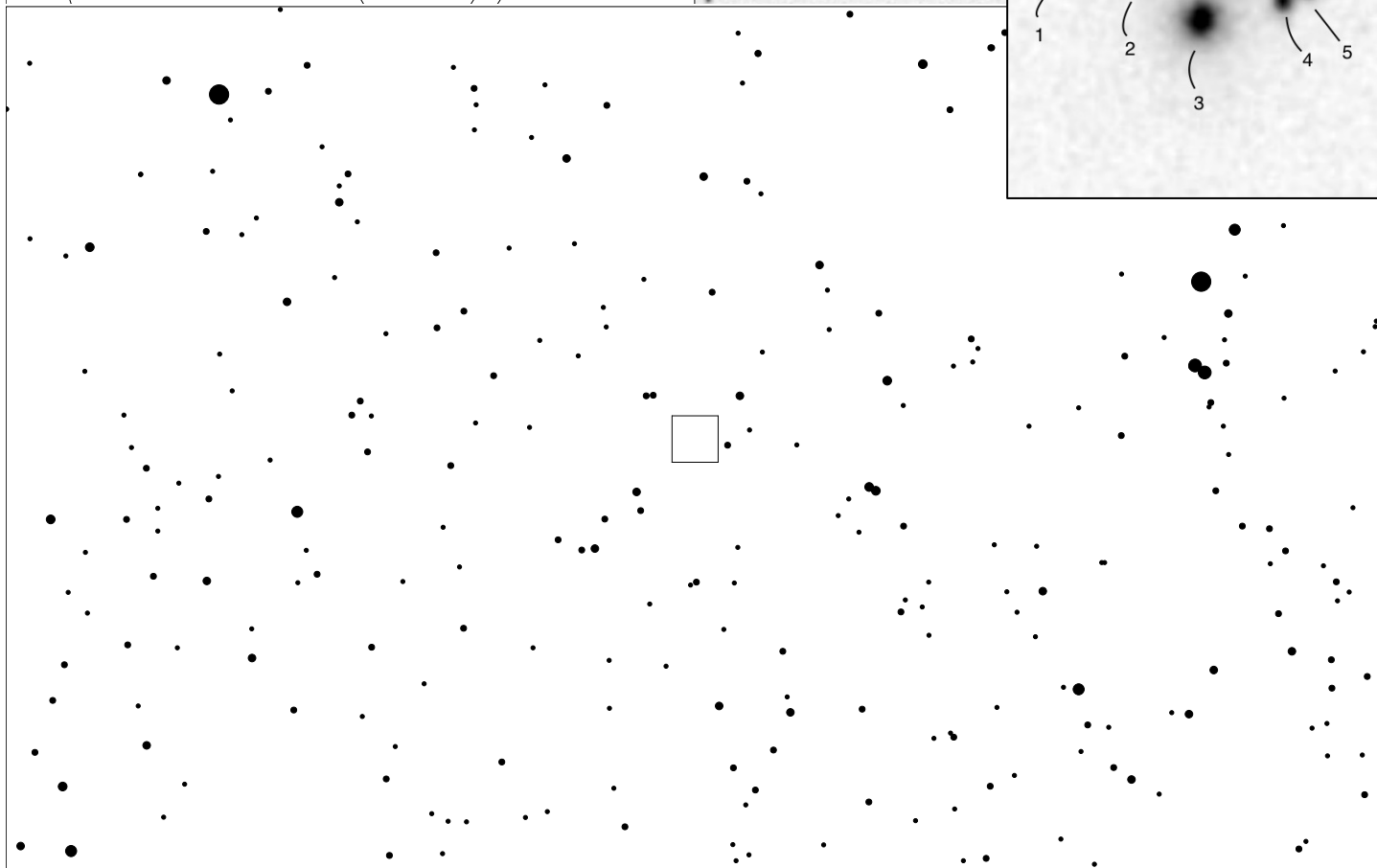
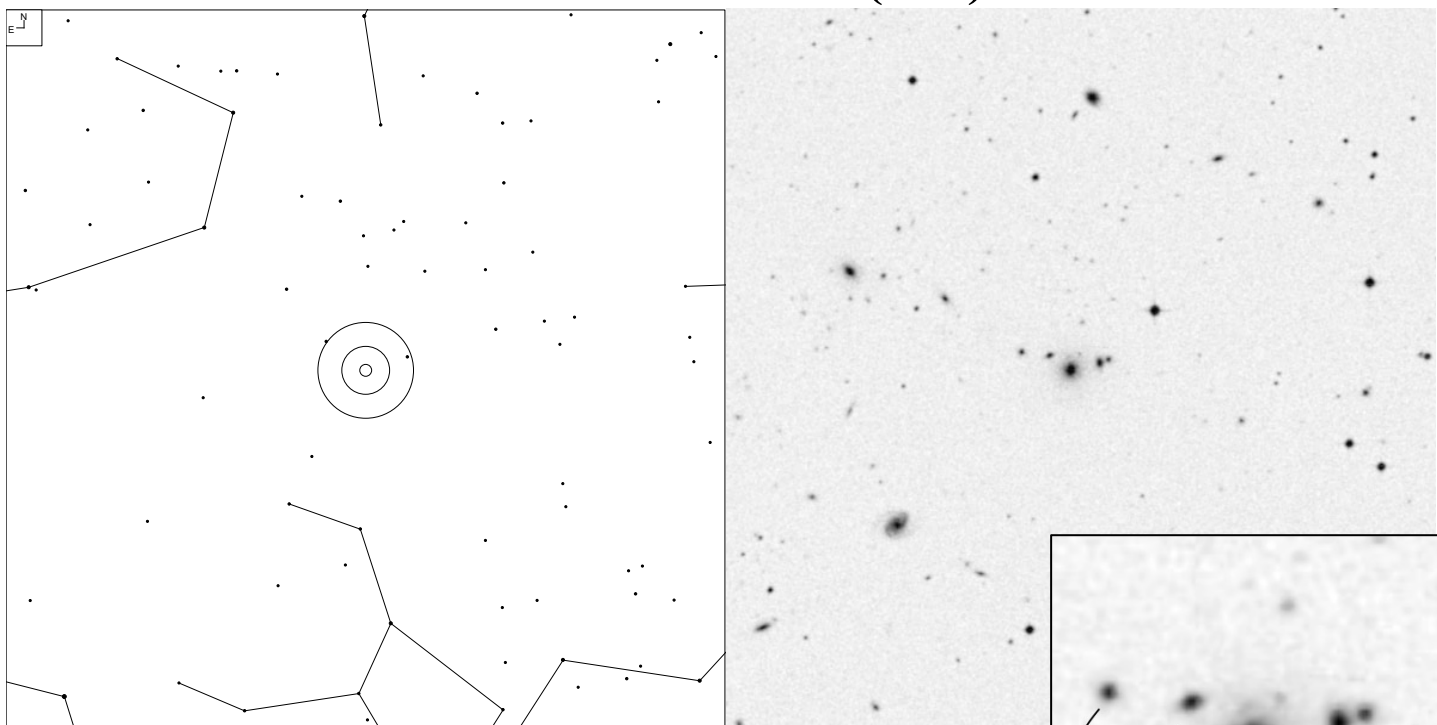
Object	RA	Dec	#	Mag	Size	Cmpt
CGCG 39-135	11 21 40	+02 53 33	11	15.5	2.7'	0.8

Shakhbazian 154 (Leo)



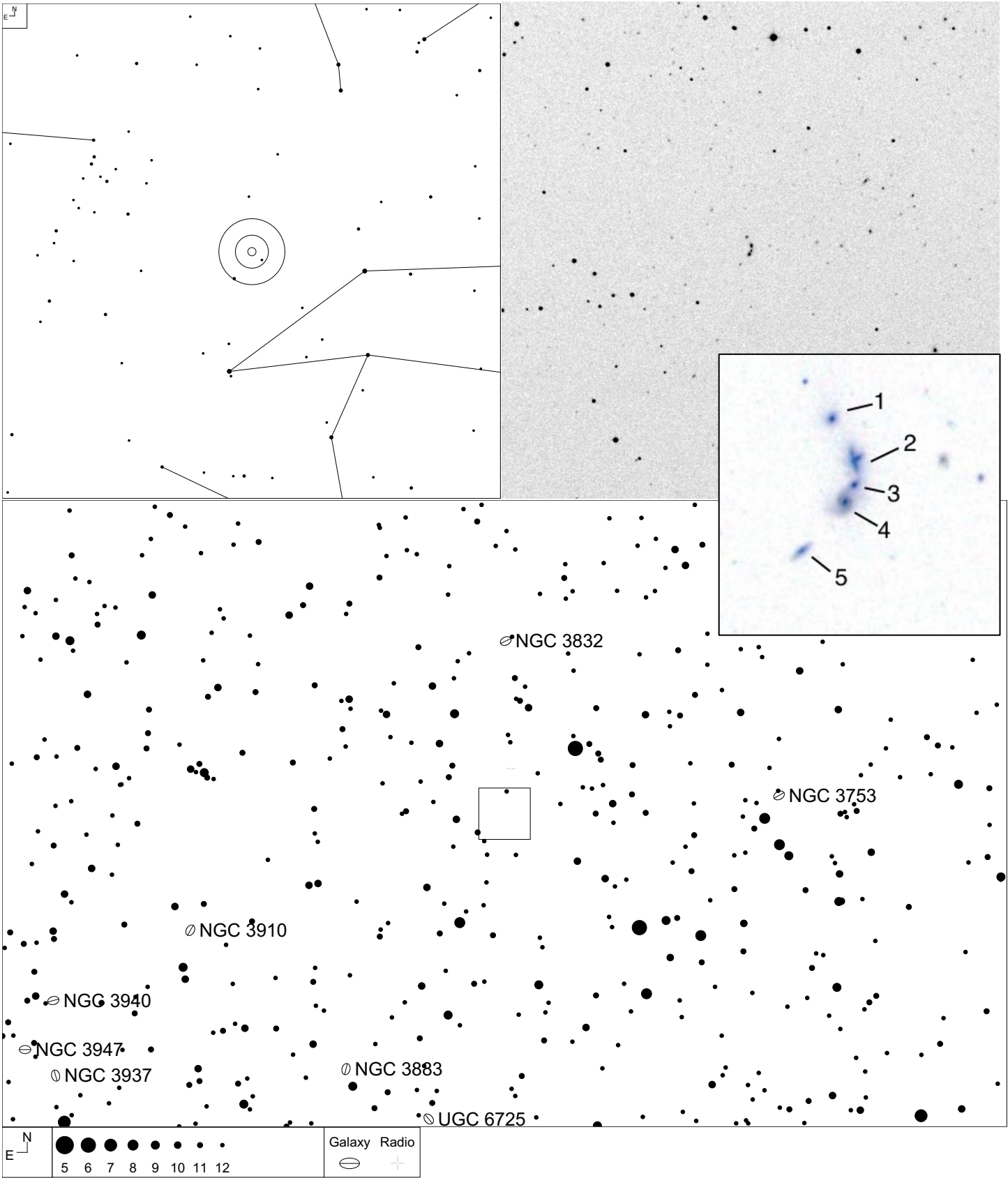
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1238	11 22 54	+01 06 52	14	16.37*	2'	0.9

Shakhbazian 322 (Leo)



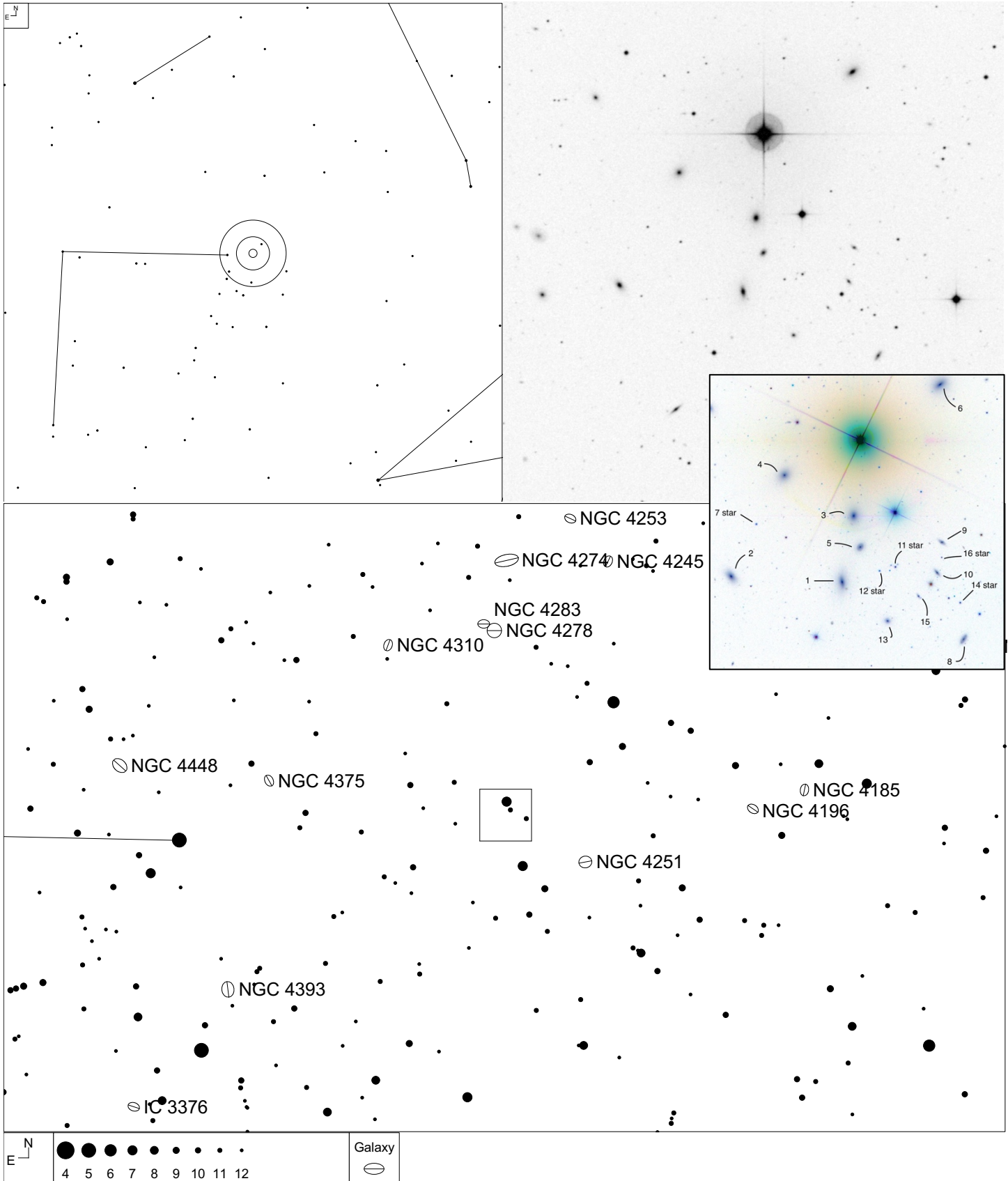
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1248	11 23 41	-04 13 03	5	16.17*	1.3'	0.5

Shakhbazian 371 (Leo)



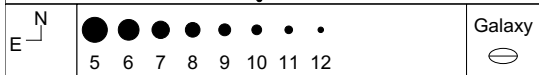
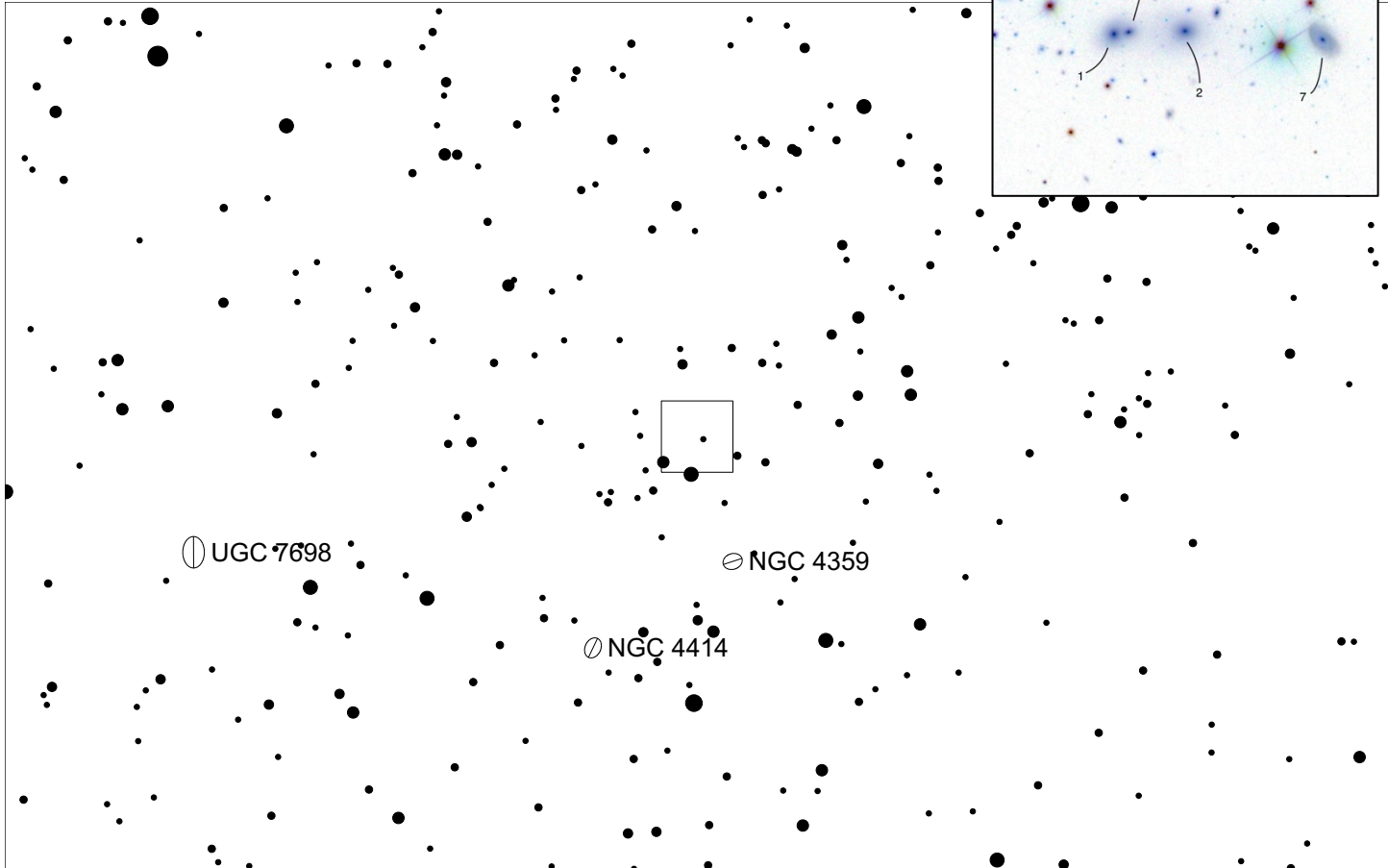
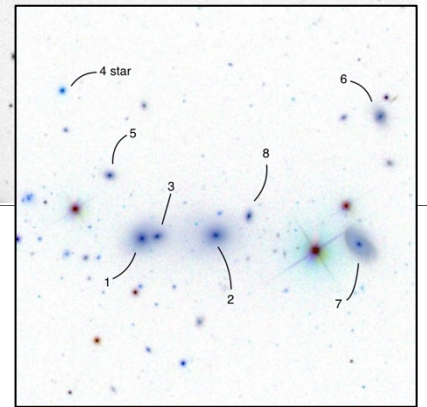
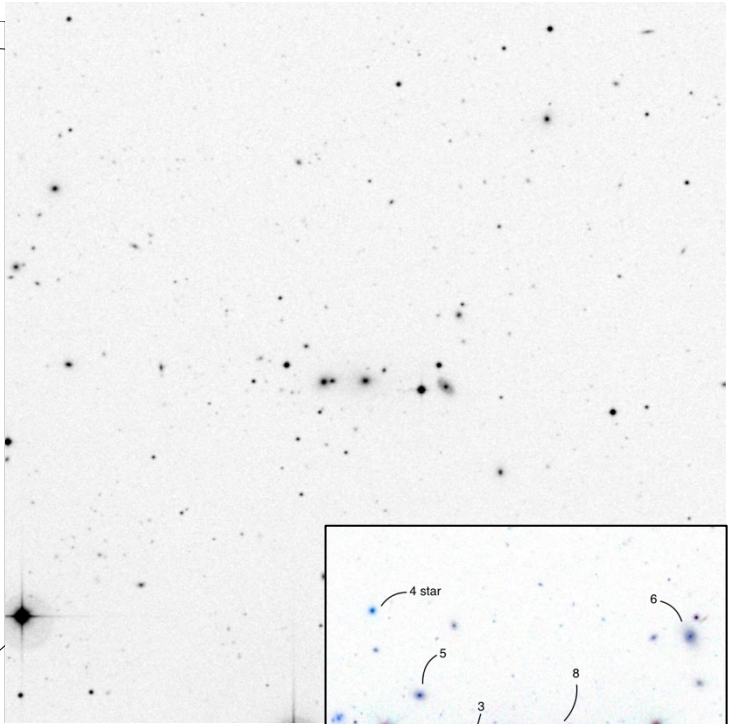
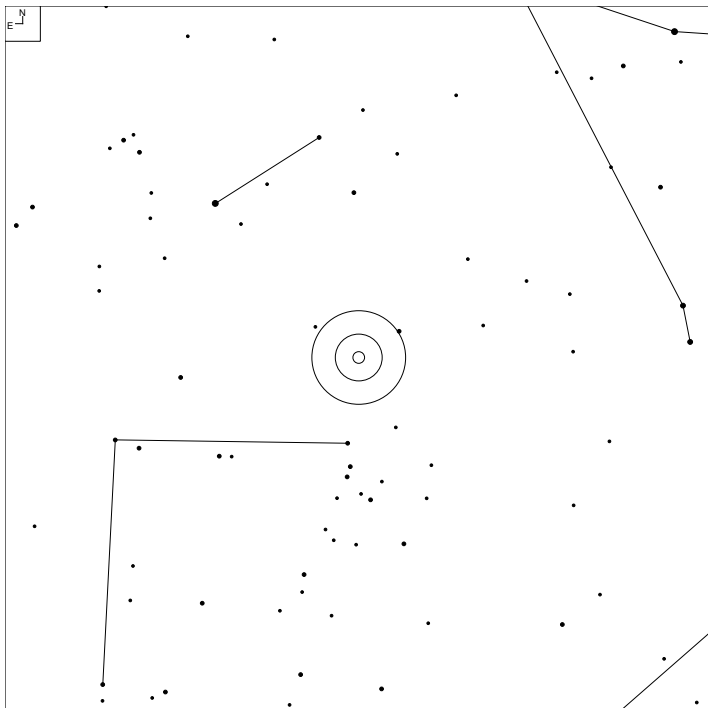
Object	RA	Dec	#	Mag	Size	Cmpt
	11 43 33	+21 53 57	5	17.6	0.9'	0.4

Shakhbazian 202 (Coma Berenices)



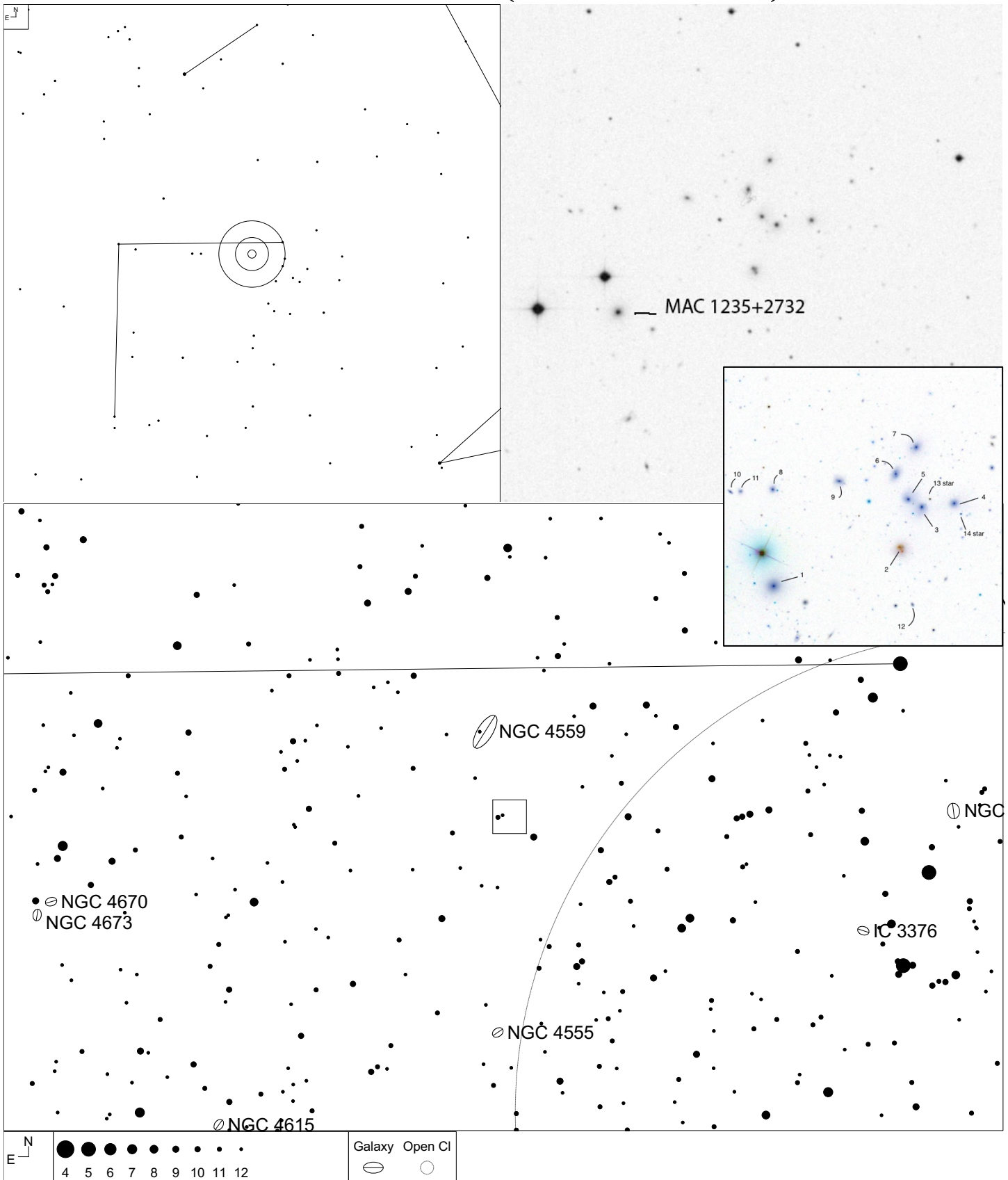
Object	RA	Dec	#	Mag	Size	Cmpt
CGCG 158-74	12 19 52	+28 24 20	15	14.6*	11'	0.2

Shakhbazian 245 (Coma Berenices)



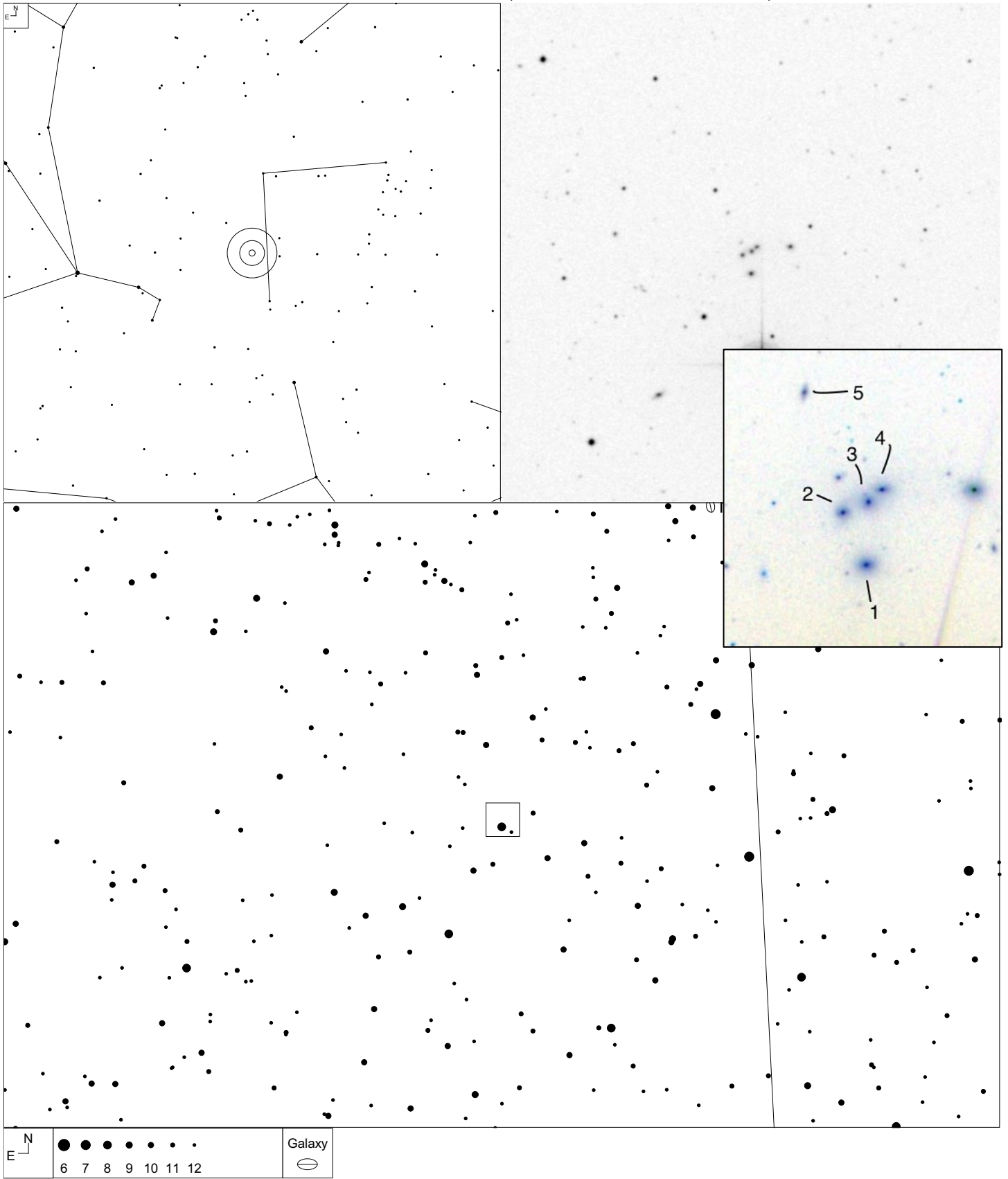
Object	RA	Dec	#	Mag	Size	Cmpt
	12 24 46	+31 57 13	8	15.6*	4.47'	0.2

Shakhbazian 205 (Coma Berenices)



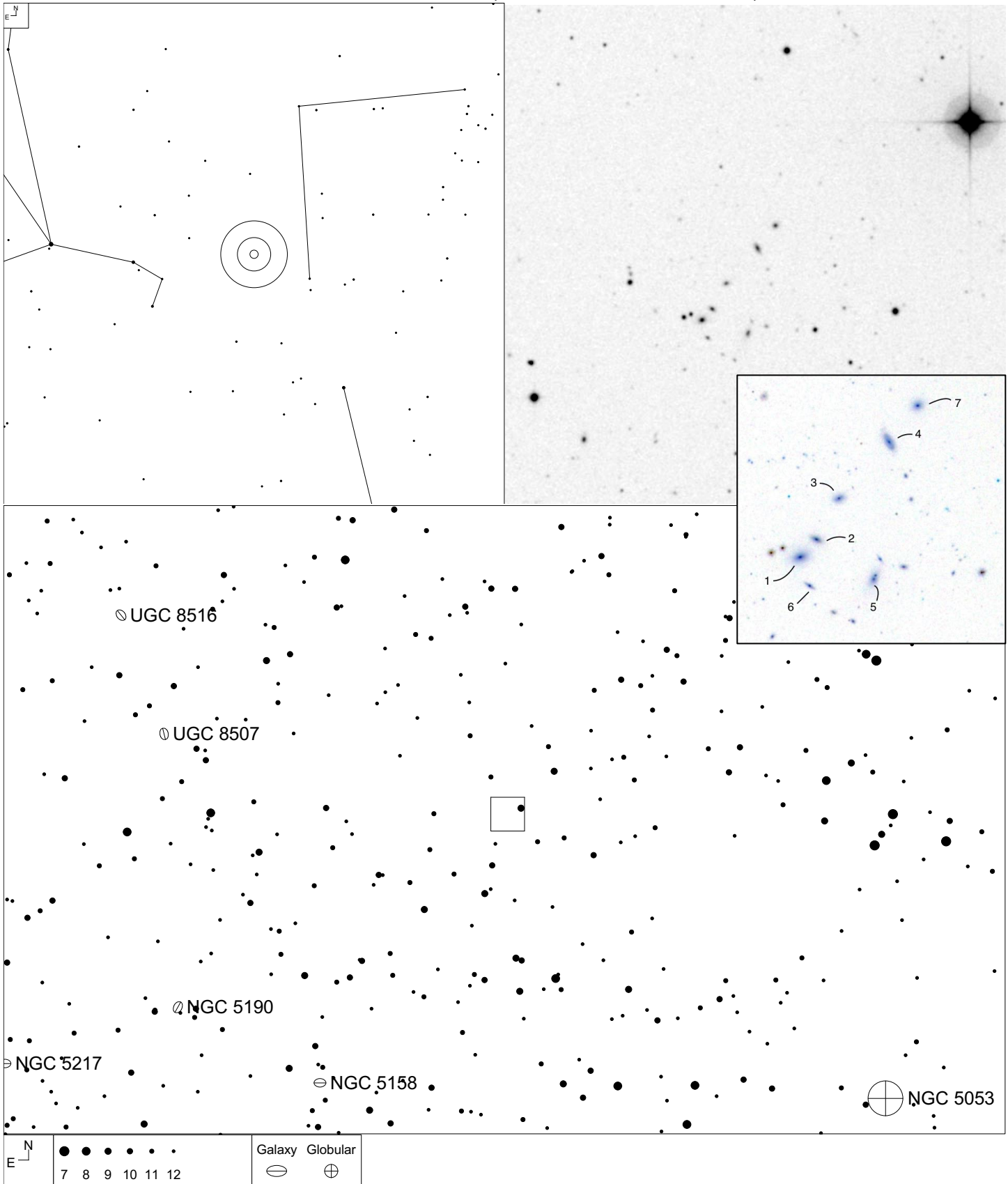
Object	RA	Dec	#	Mag	Size	Cmpt
	12 35 23	+27 34 29	14	15.4*	4.5'	0.4

Shakhbazian 374 (Coma Berenices)



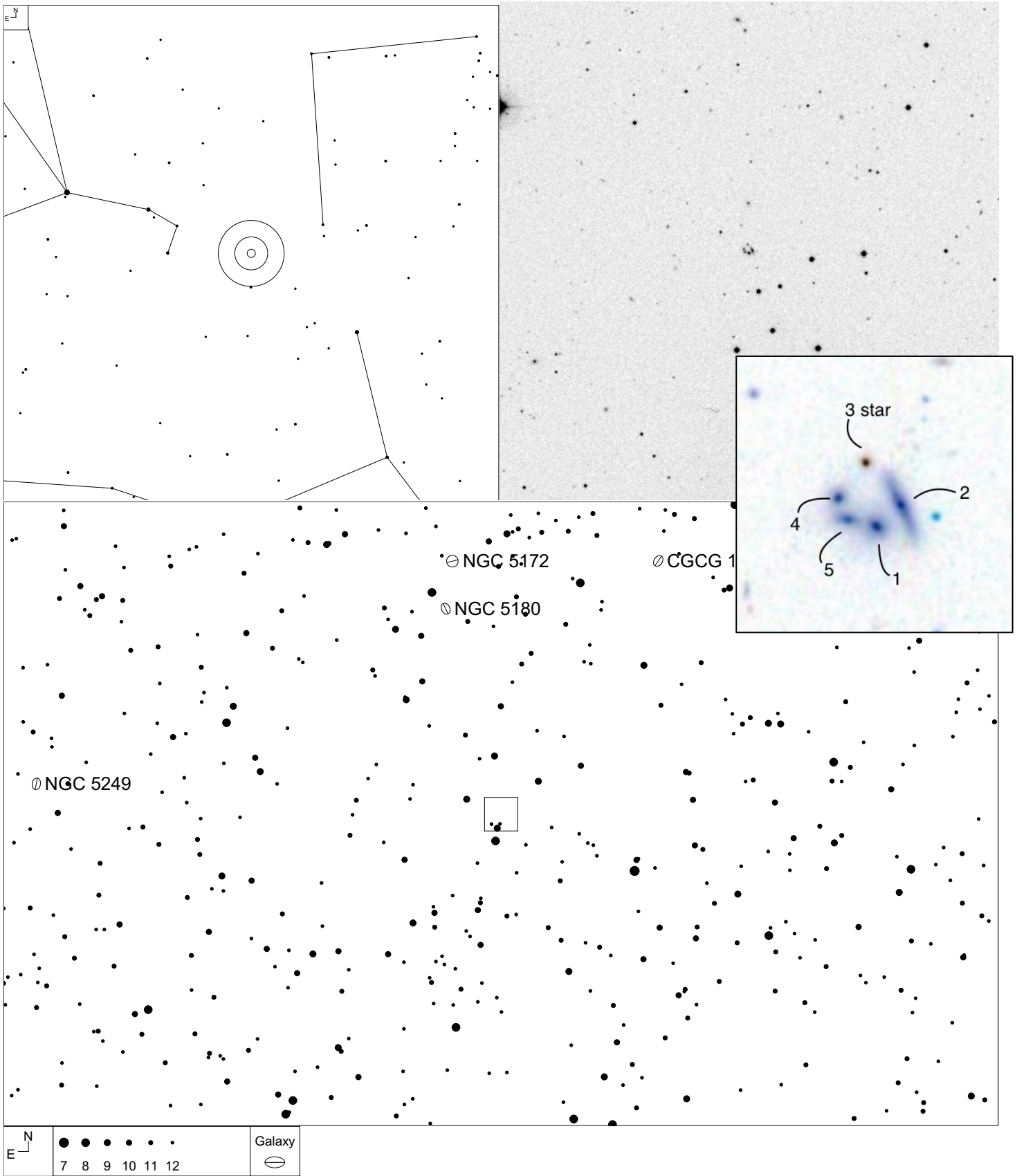
Object	RA	Dec	#	Mag	Size	Cmpt
	13 15 58	+21 26 11	5	17.29	1.3'	0.4

Shakhbazian 9 (Coma Berenices)



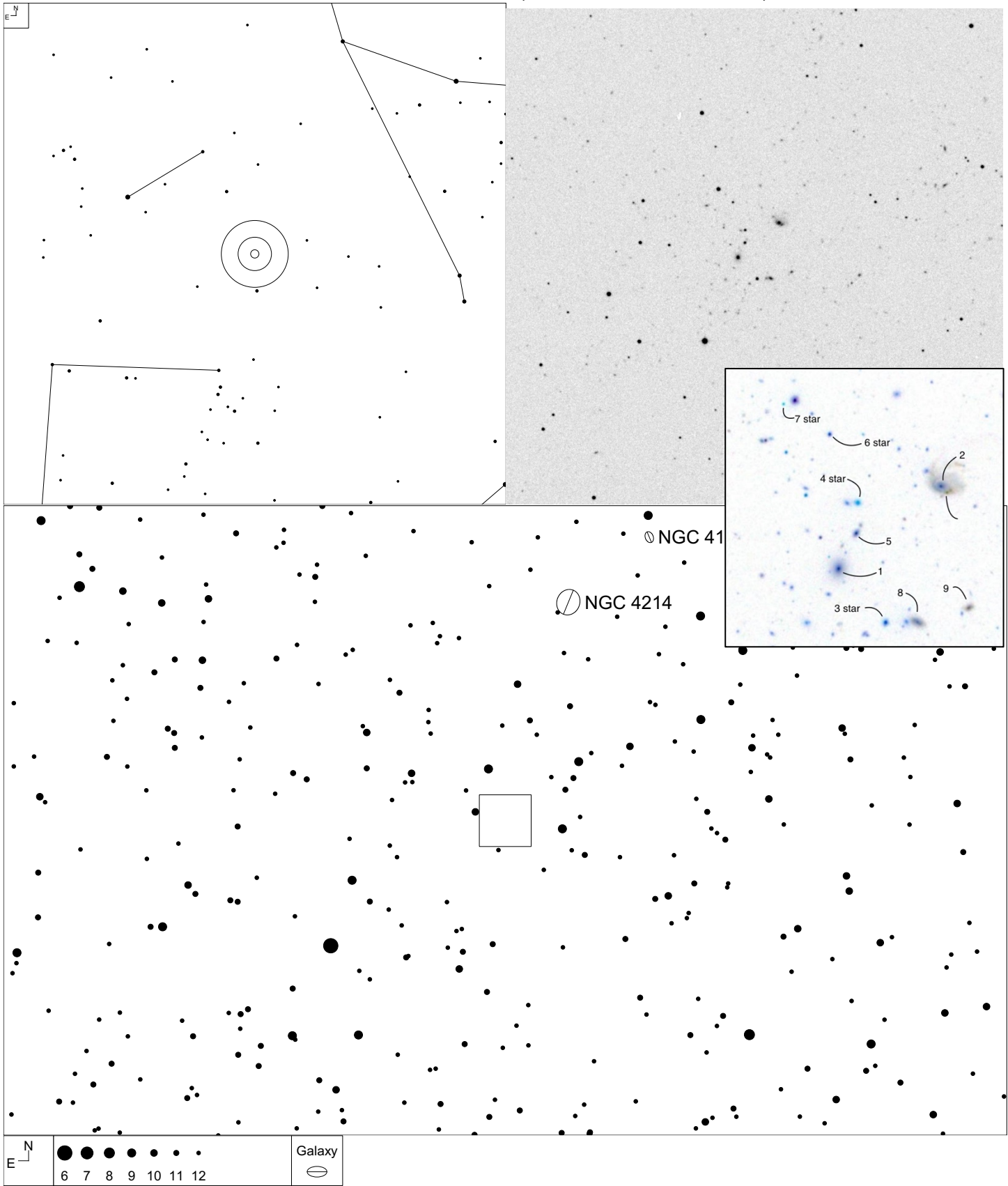
Object	RA	Dec	#	Mag	Size	Cmpt
	13 24 05	+19 02 01	7	17.1	2.5'	0.7

Shakhbazian 19 (Coma Berenices)



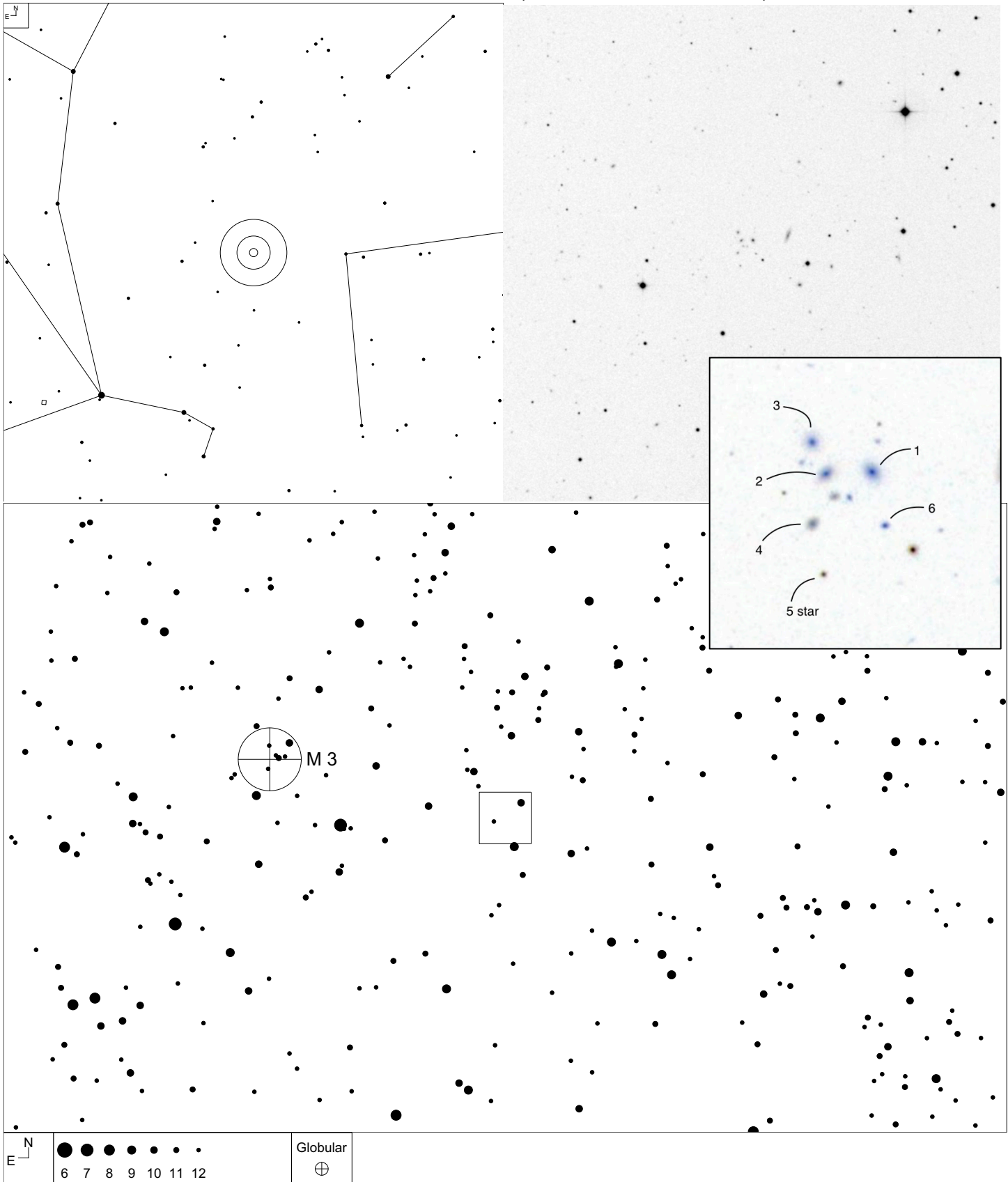
Object	RA	Dec	#	Mag	Size	Cmpt
Rose 13, VV 678	13 28 30	+15 50 22	5	17.0	0.35'	2.1

Shakhbazian 244 (Canes Venatici)



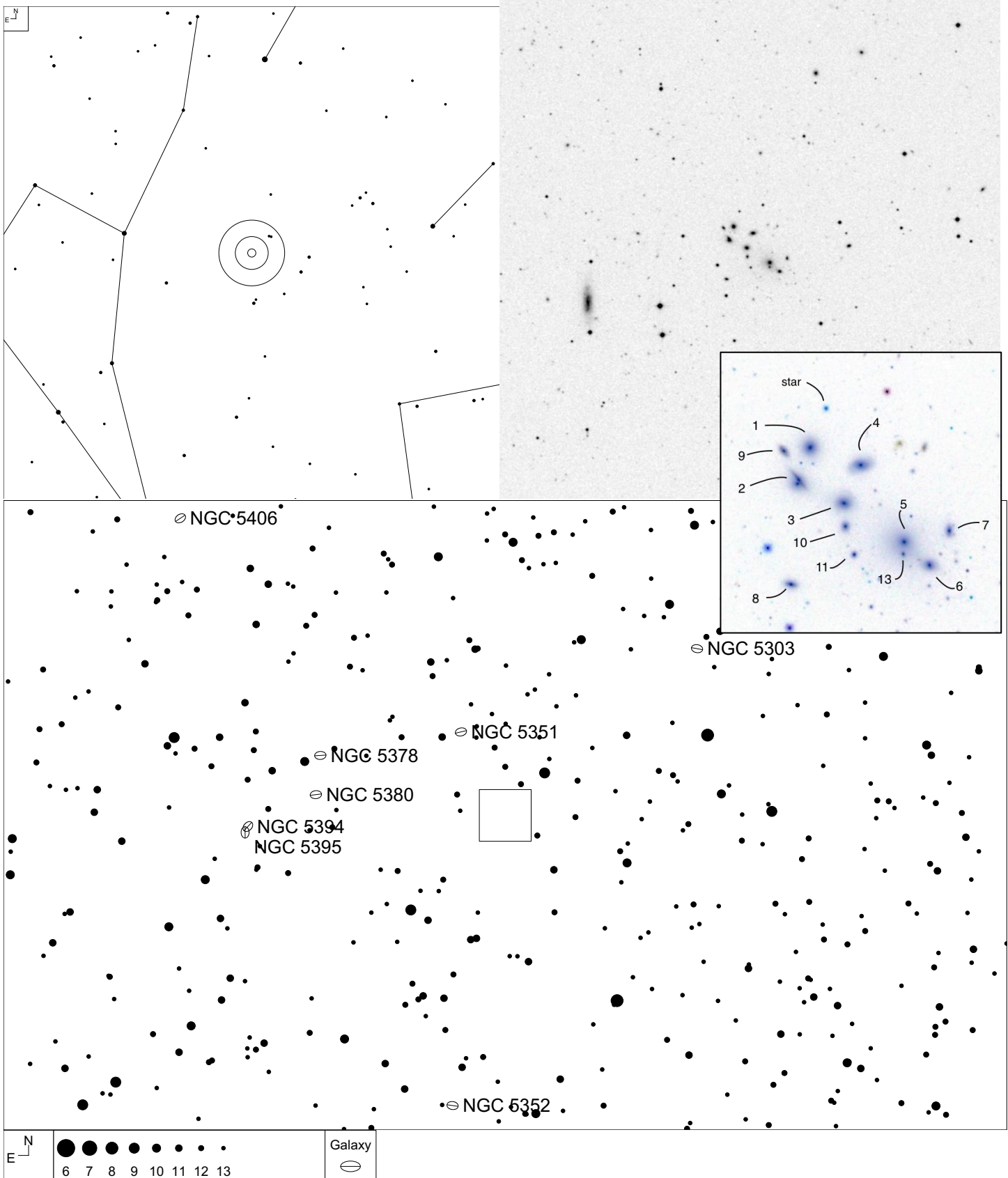
Object	RA	Dec	#	Mag	Size	Cmpt
	12 17 09	+35 17 11	10	16.67	2.27	0.3

Shakhbazian 212 (Canes Venatici)



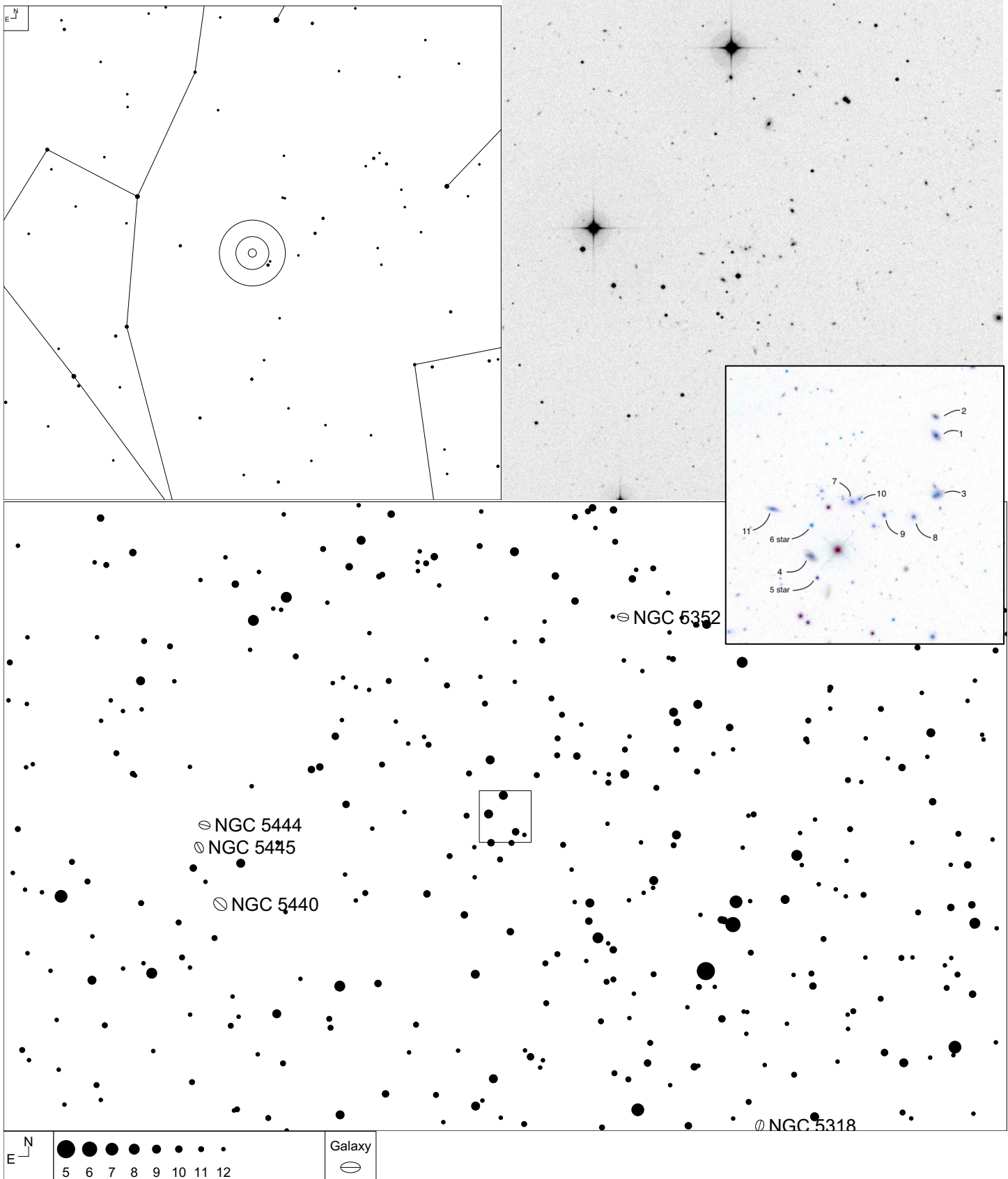
Object	RA	Dec	#	Mag	Size	Cmpt
	13 37 06	+28 06 08	6	18.10	1.1	0.6

Shakhbazian 253 (Canes Venatici)



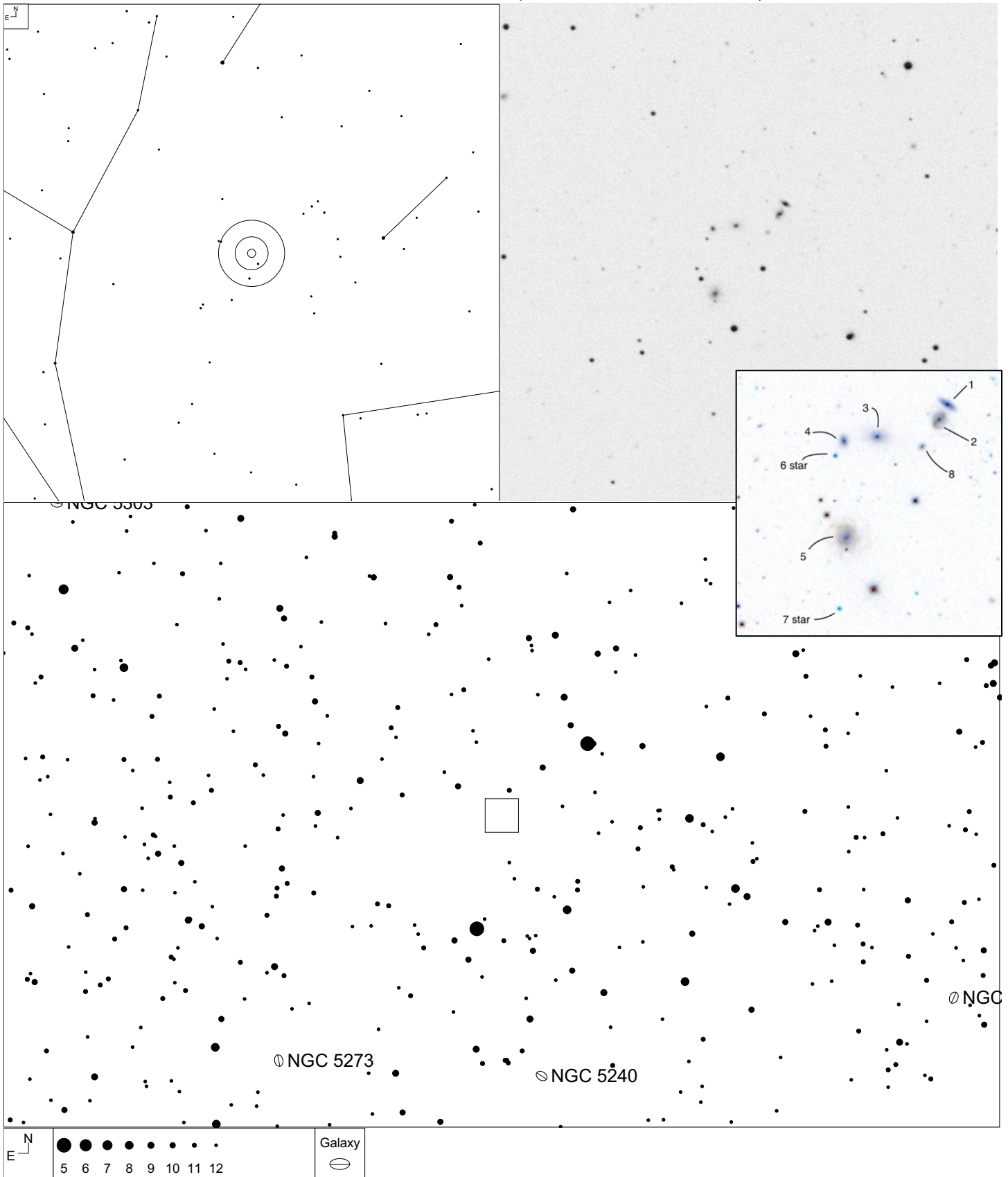
Object	RA	Dec	#	Mag	Size	Cmpt
	13 52 24	+37 31 00	13	16.5	2.22'	0.7

Shakhbazian 254 (Canes Venatici)



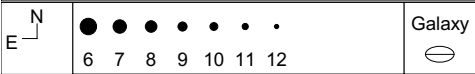
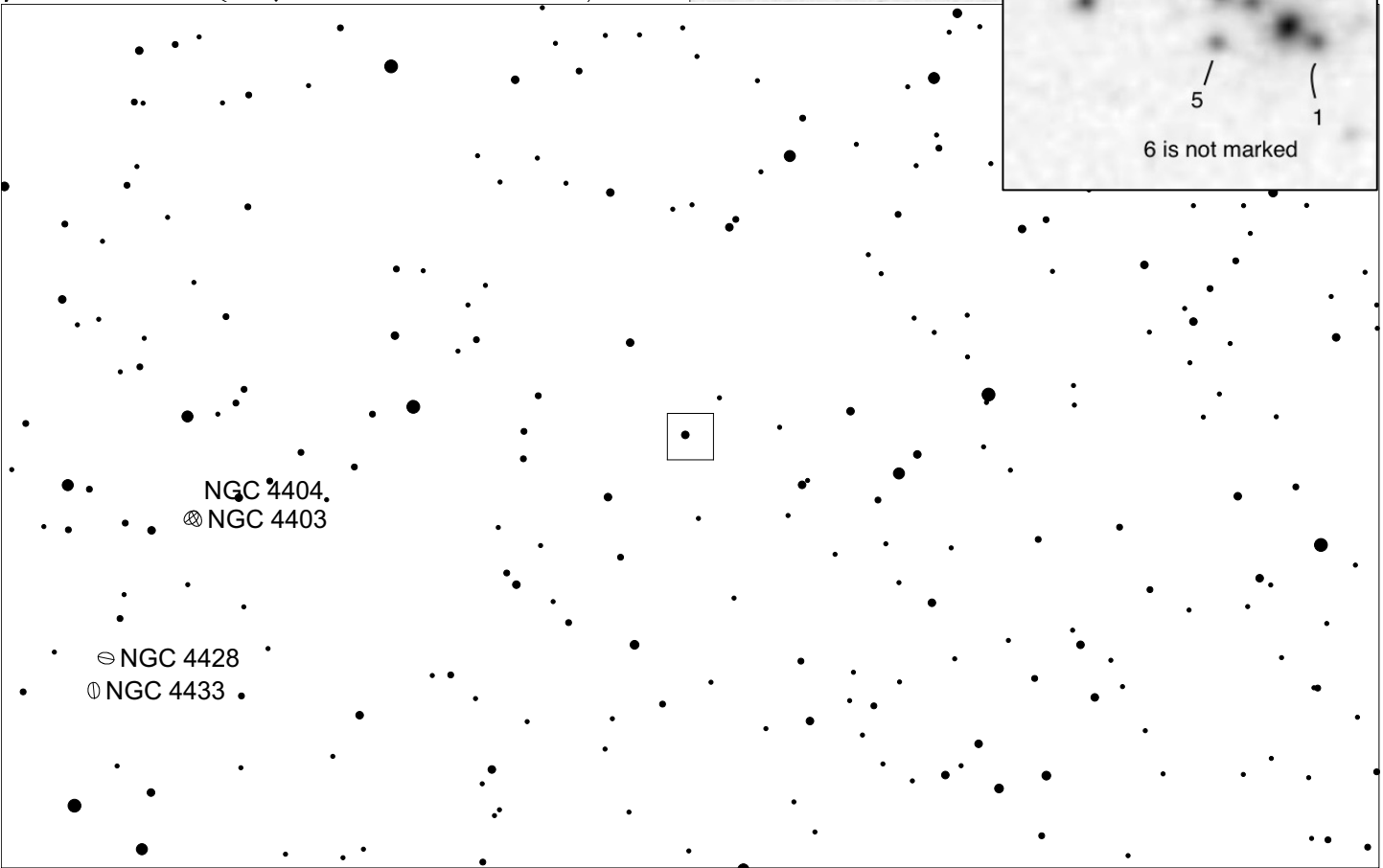
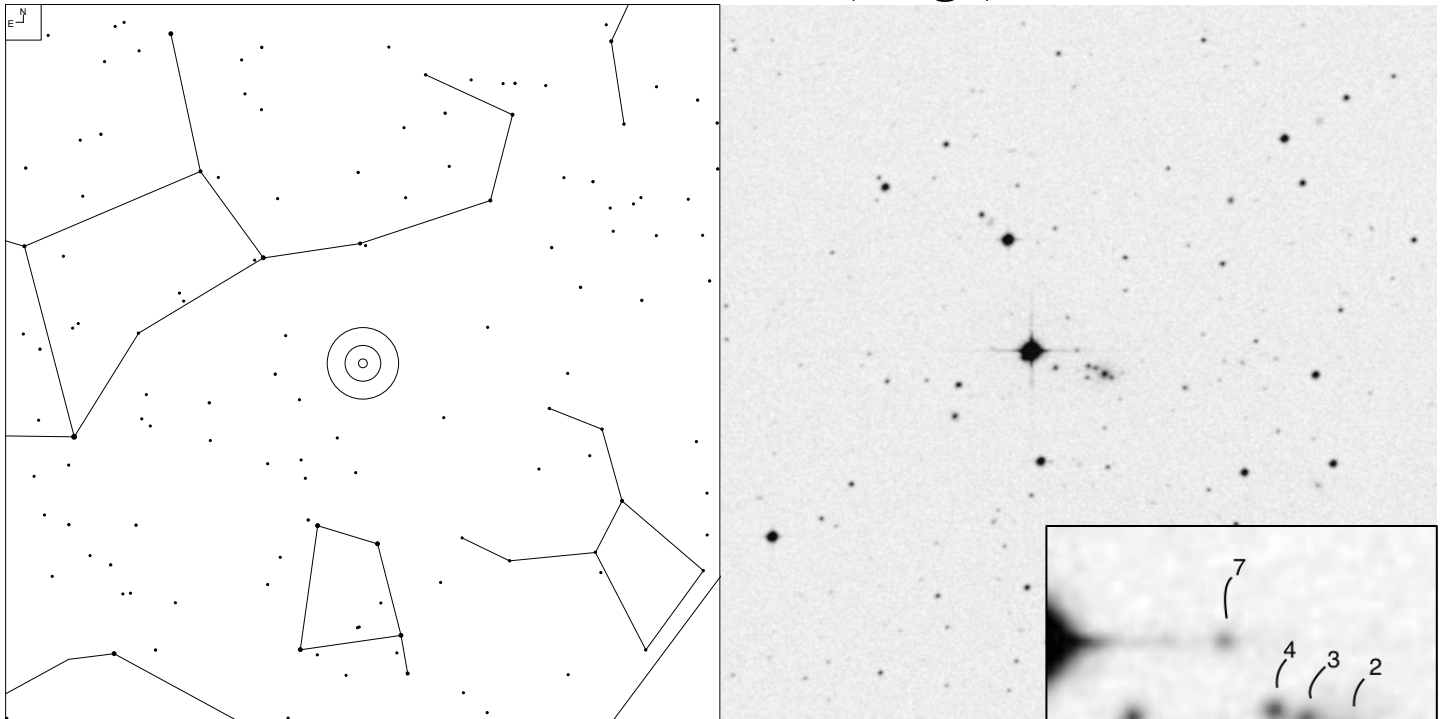
Object	RA	Dec	#	Mag	Size	Cmpt
	13 56 25	+35 11 10	11	17.4	3.35'	0.3

Shakhbazian 251 (Canes Venatici)



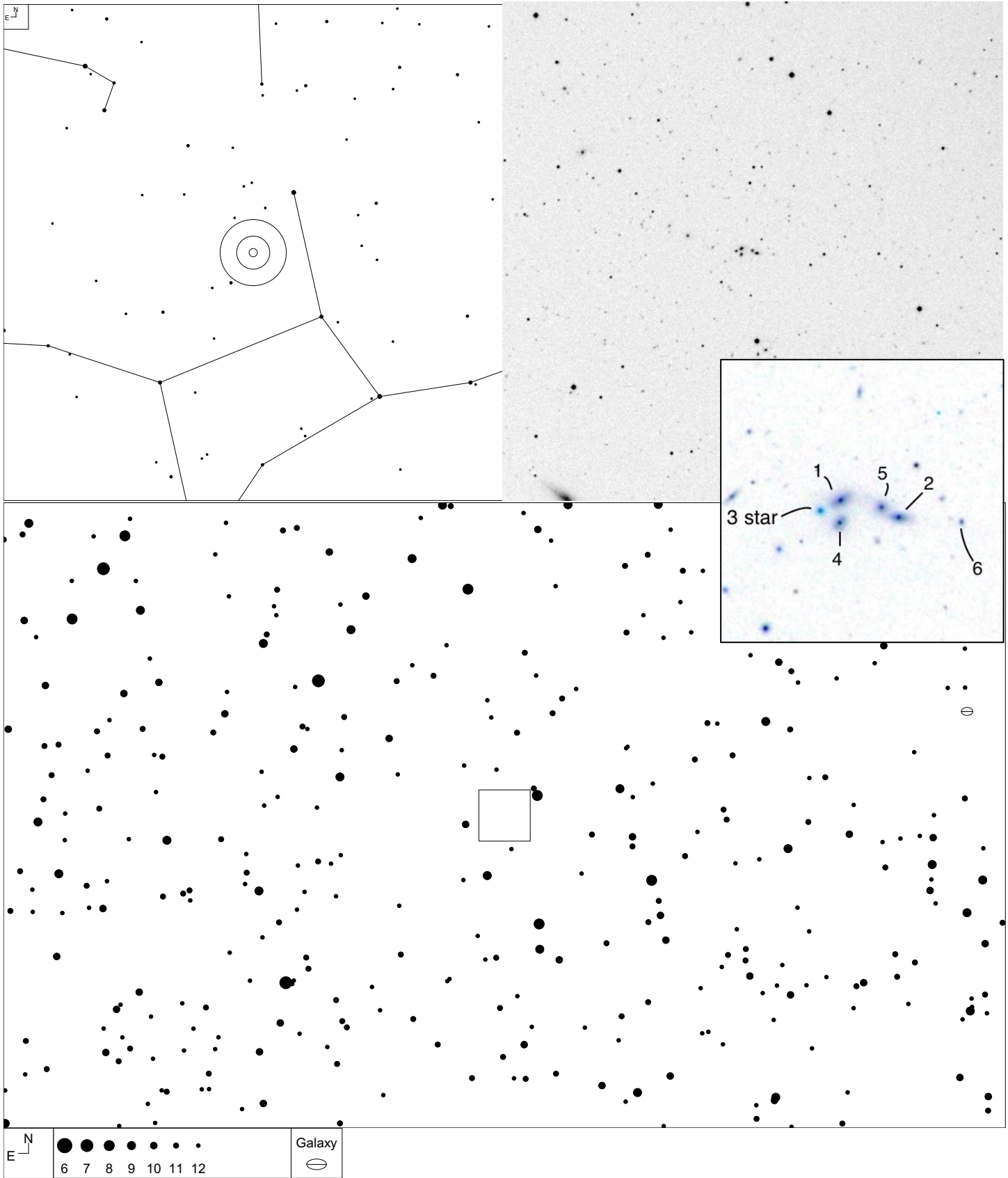
Object	RA	Dec	#	Mag	Size	Cmpt
	13 36 52	+36 50 22	8	16.49*	3.35'	0.3

Shakhbazian 323 (Virgo)



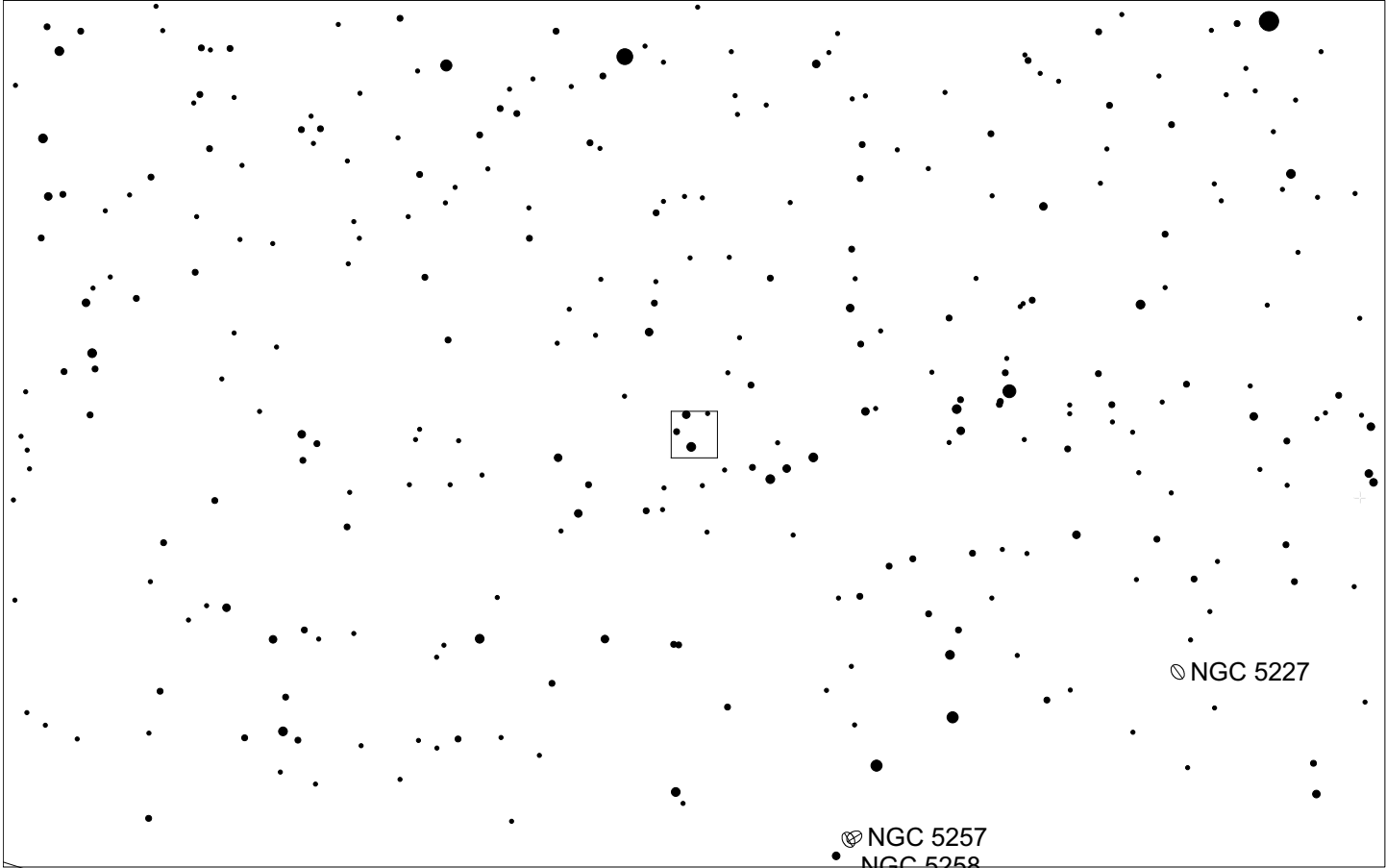
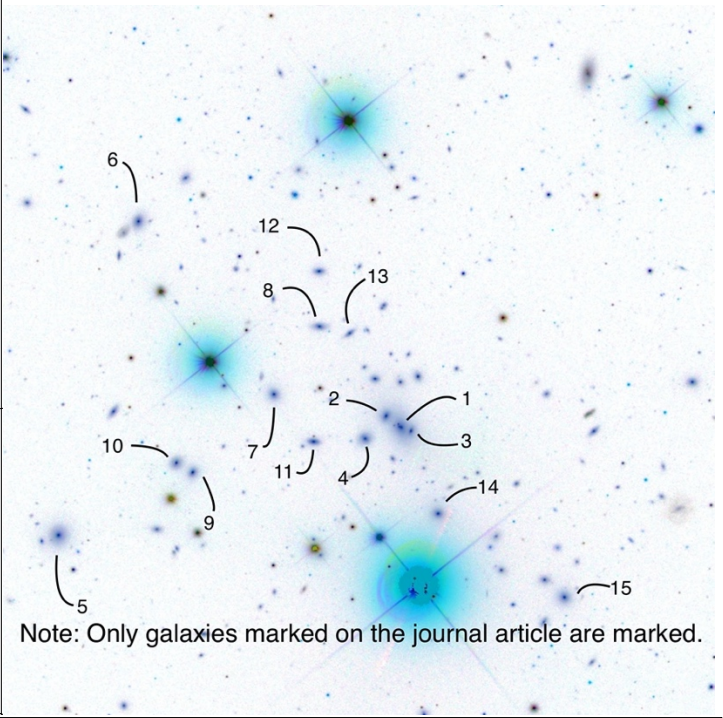
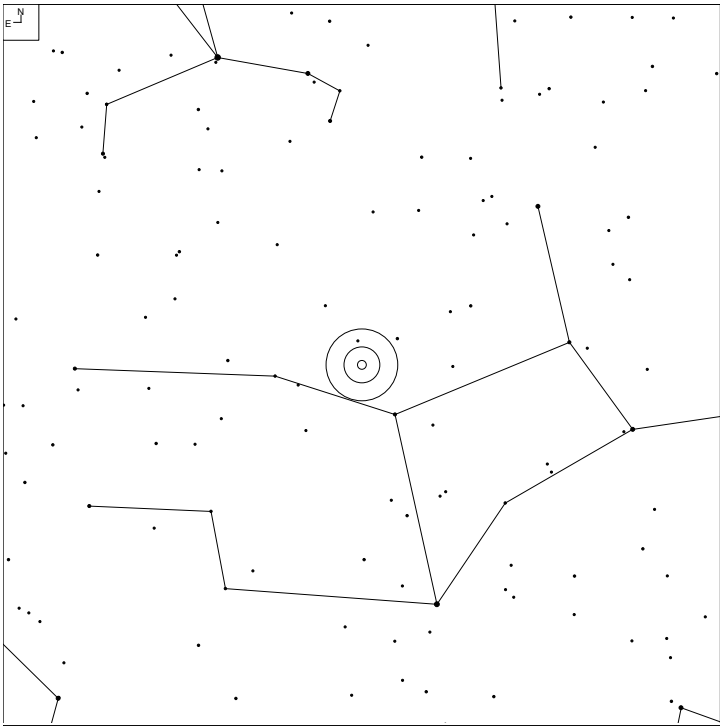
Object	RA	Dec	#	Mag	Size	Cmpt
	12 19 17	-07 24 13	7	17.19*	1.2'	0.5

Shakhbazian 355 (Virgo)



Object	RA	Dec	#	Mag	Size	Cmpt
	13 12 11	+07 18 29	6	17.27*	0.6'	1

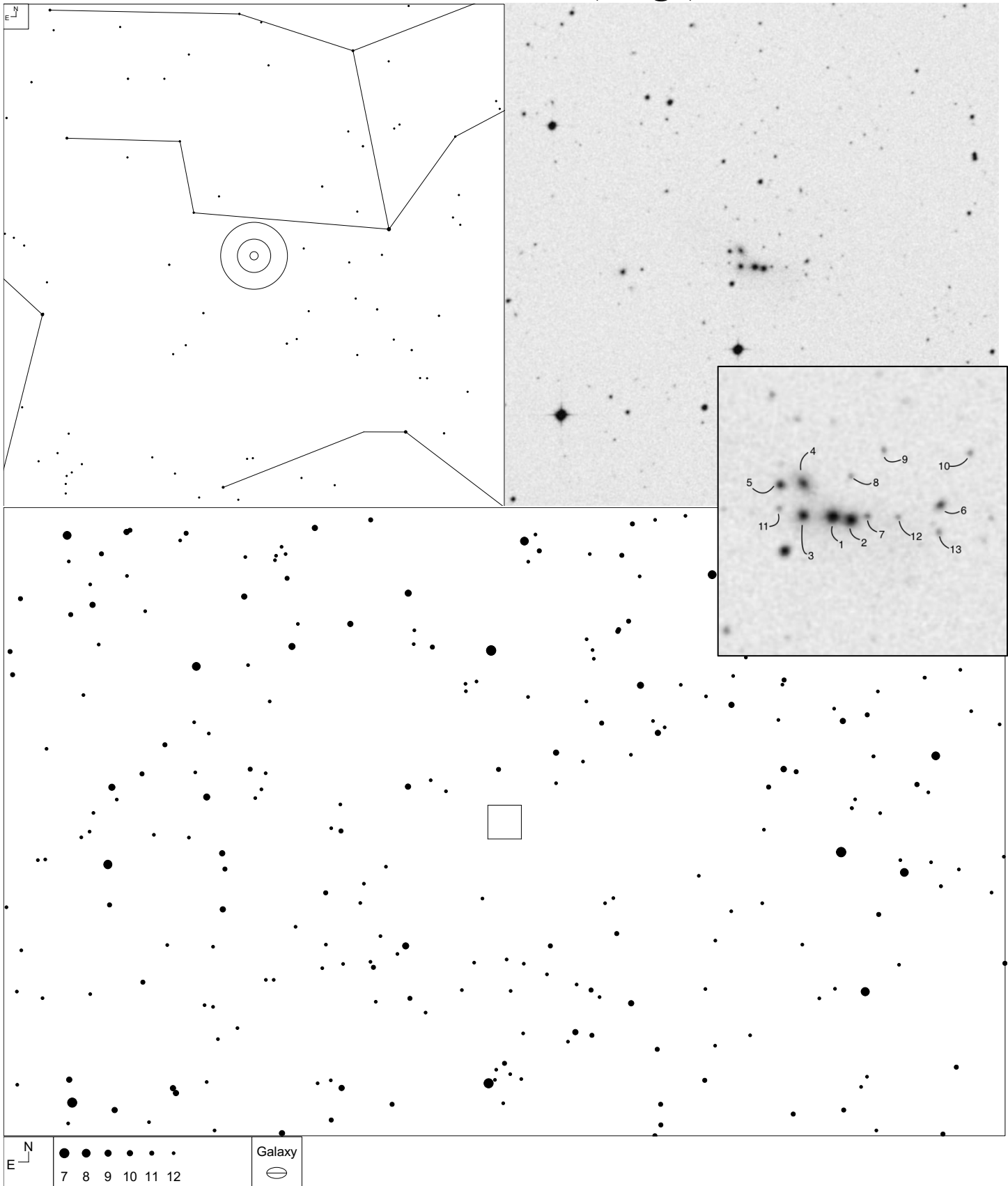
Shakhbazian 357 (Virgo)



E ↙ N ↑	● ● ● ● ● ● ● ●	Galaxy	Radio
	5 6 7 8 9 10 11 12	☉	+

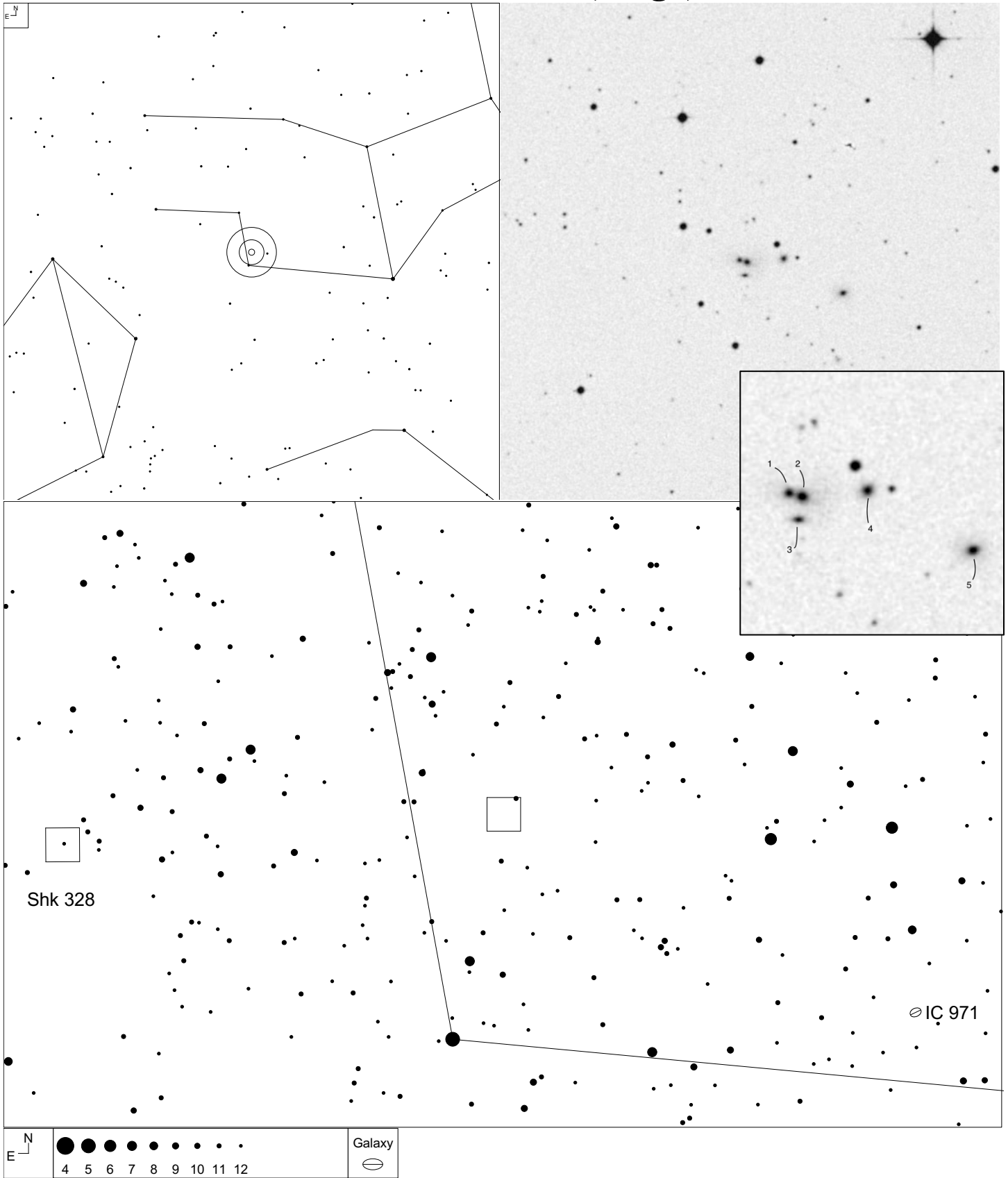
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1773	13 42 09	+02 13 38	15	16.35*	7.1'	0.9

Shakhbazian 289 (Virgo)



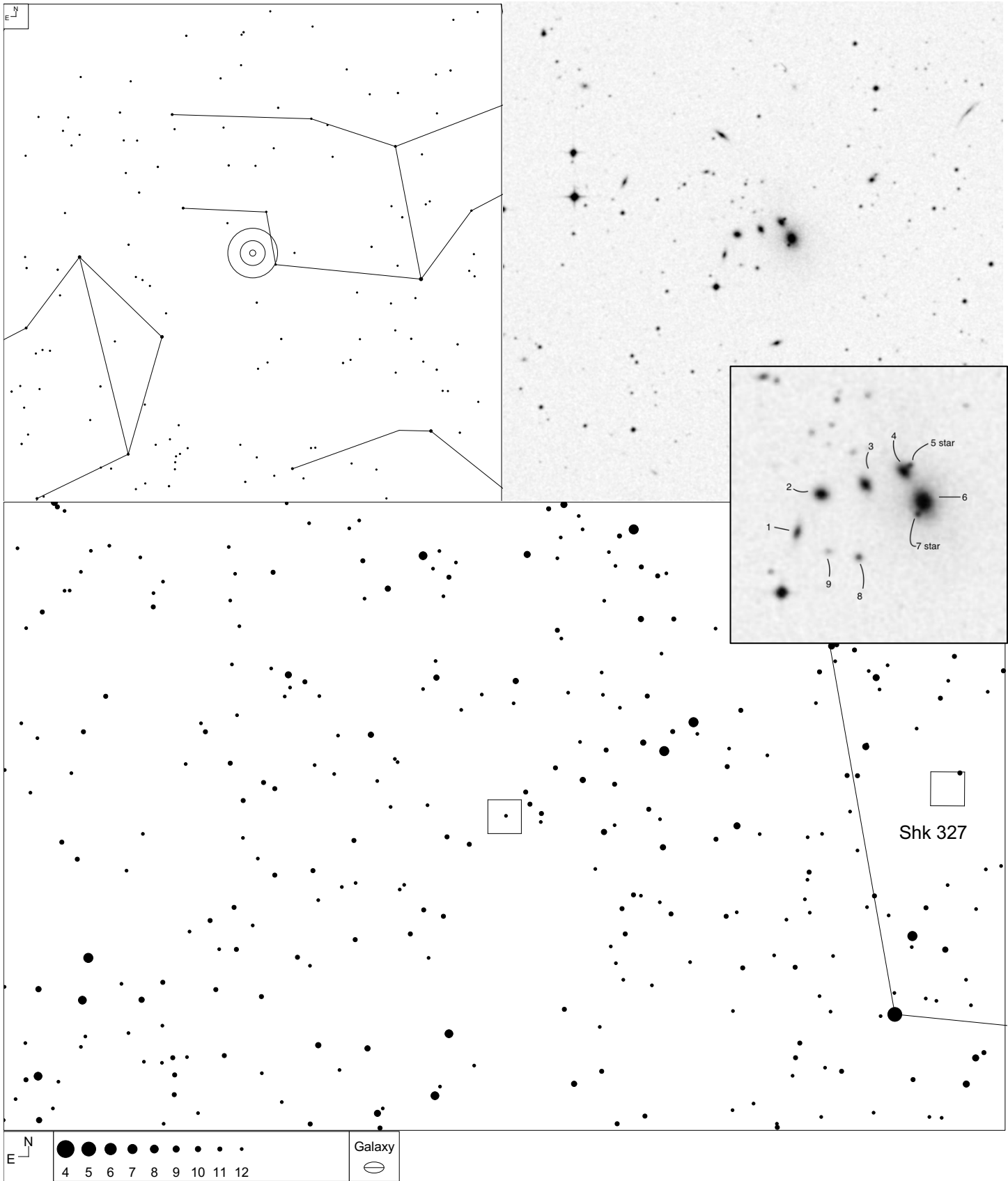
Object	RA	Dec	#	Mag	Size	Cmpt
	13 58 11	-12 52 35	13	17.55*	1.6'	0.6

Shakhbazian 327 (Virgo)



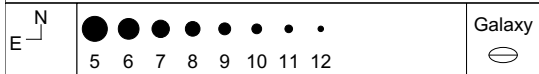
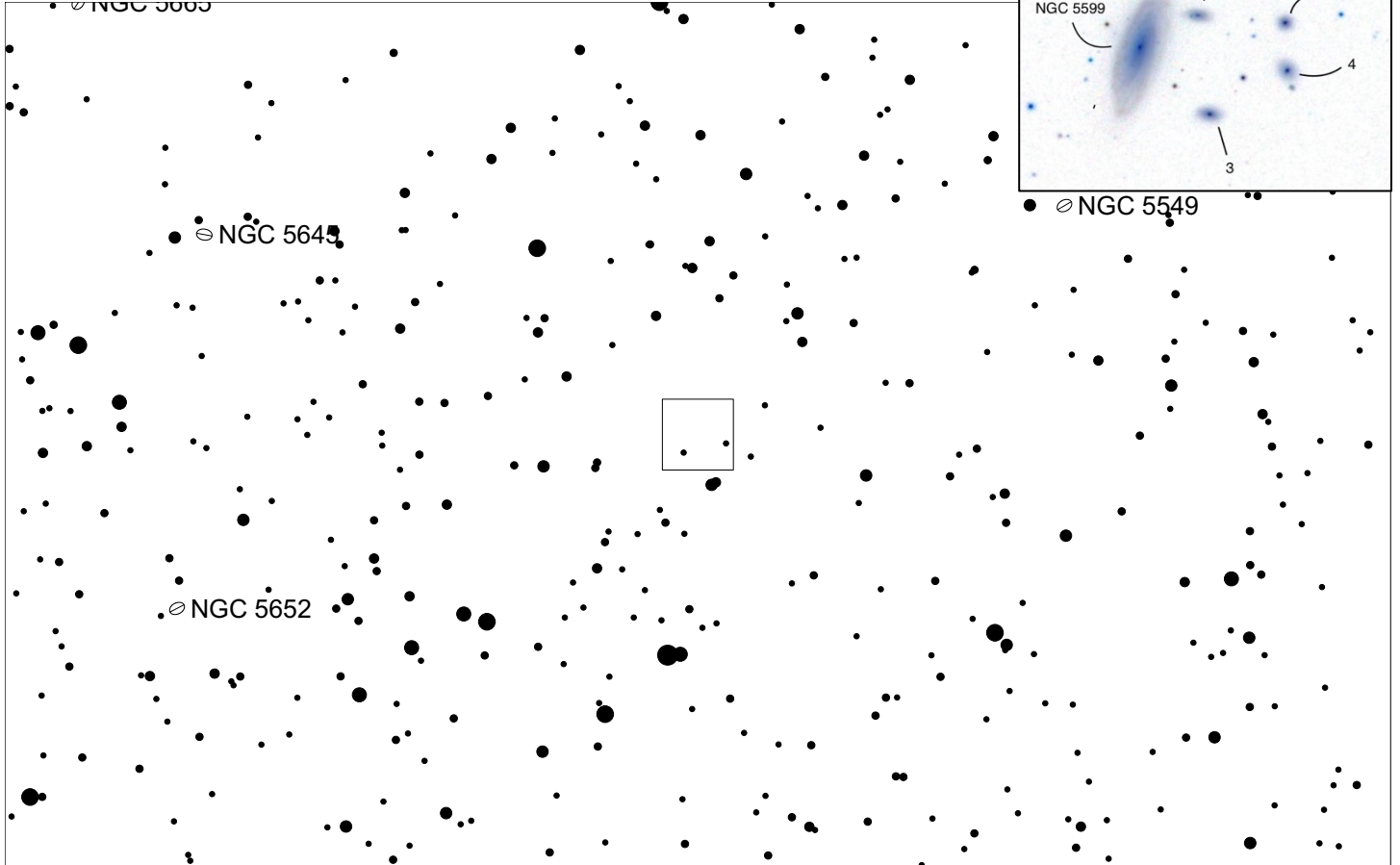
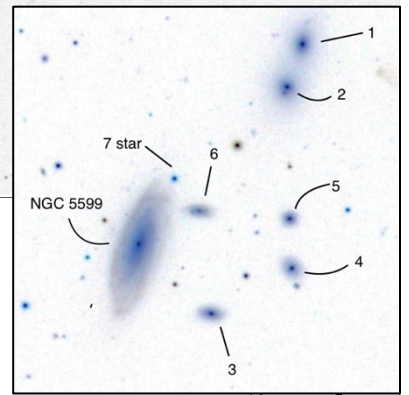
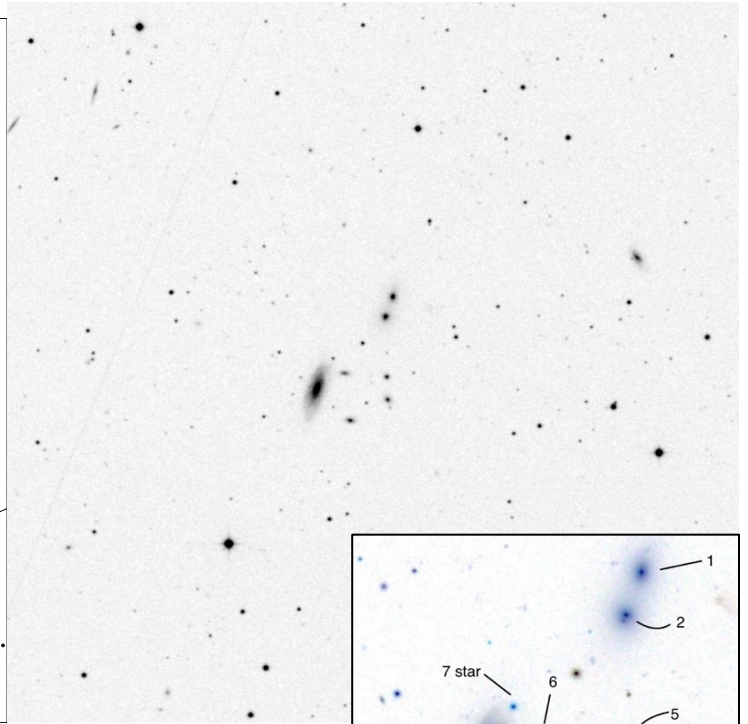
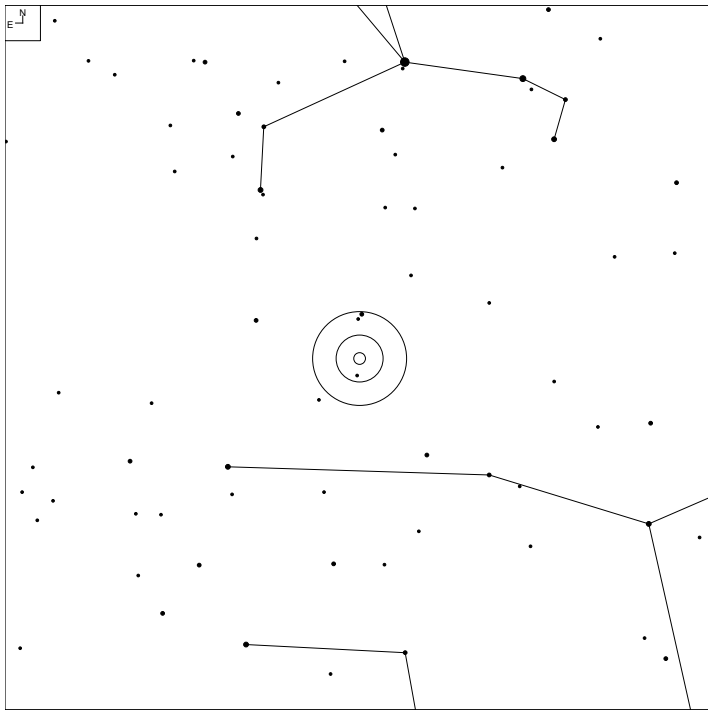
Object	RA	Dec	#	Mag	Size	Cmpt
	14 11 54	-09 11 48	5	16.76*	1.1'	0.5

Shakhbazian 328 (Virgo)



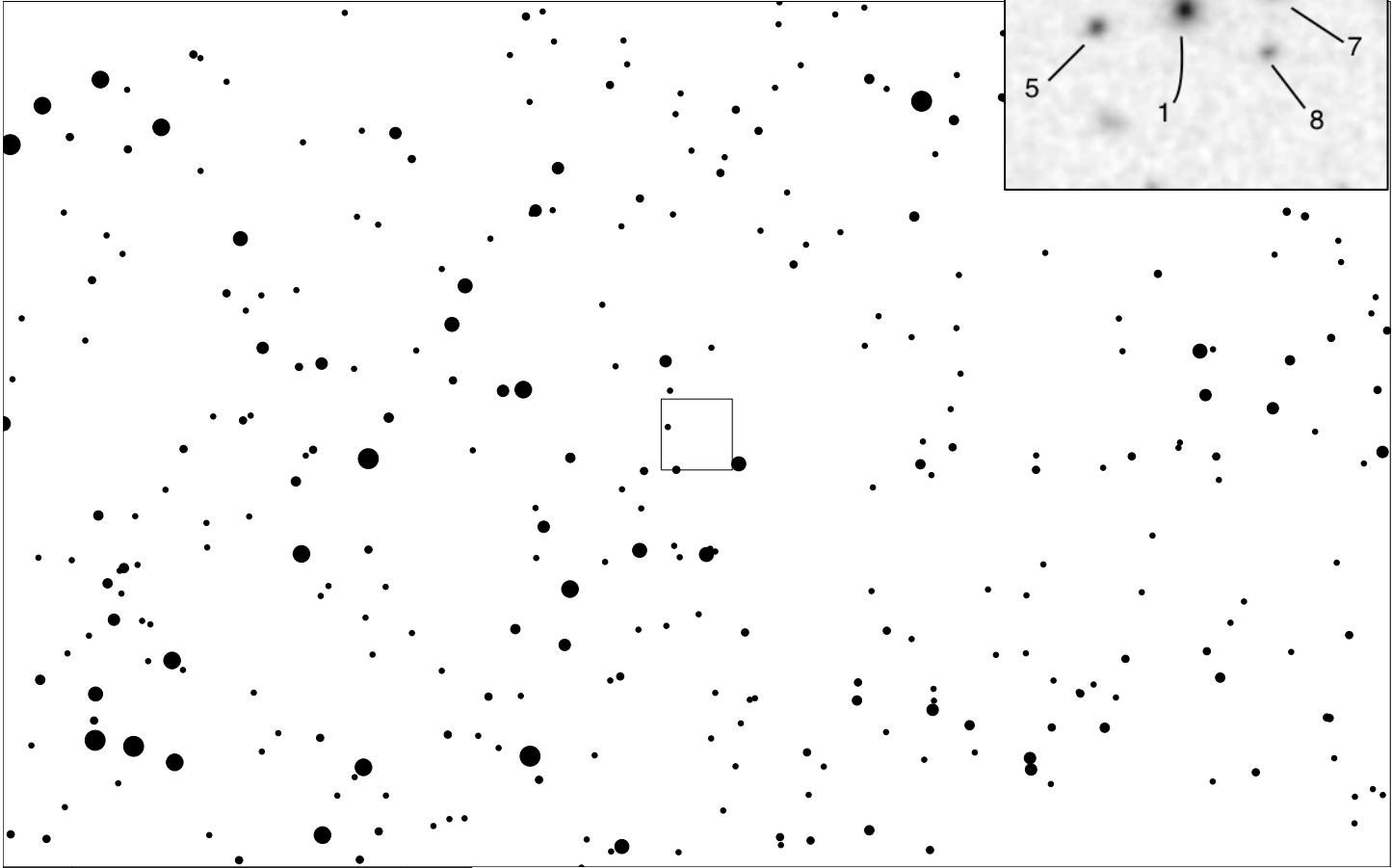
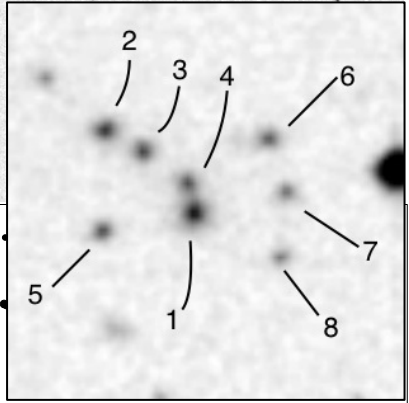
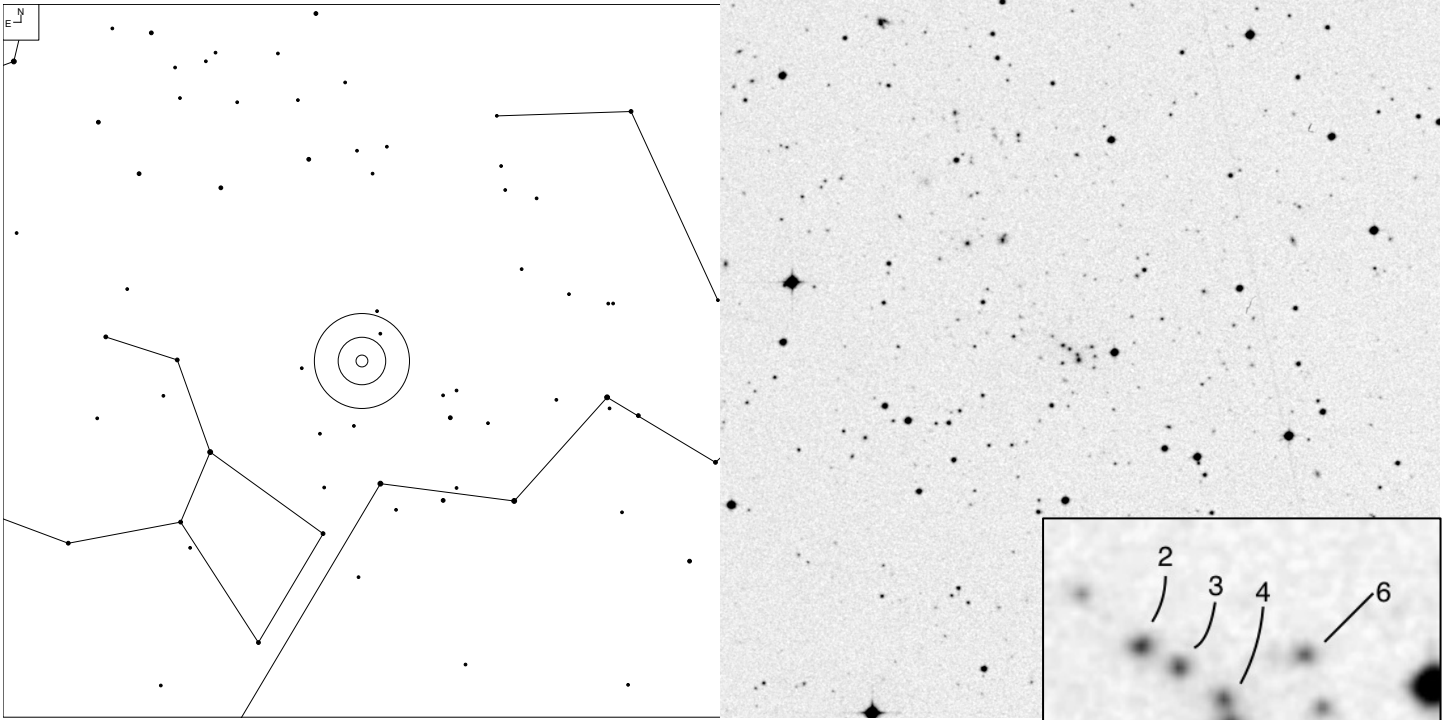
Object	RA	Dec	#	Mag	Size	Cmpt
	14 20 28	-09 20 11	9	14.71*	1.6'	0.5

Shakhbazian 358 (Virgo)



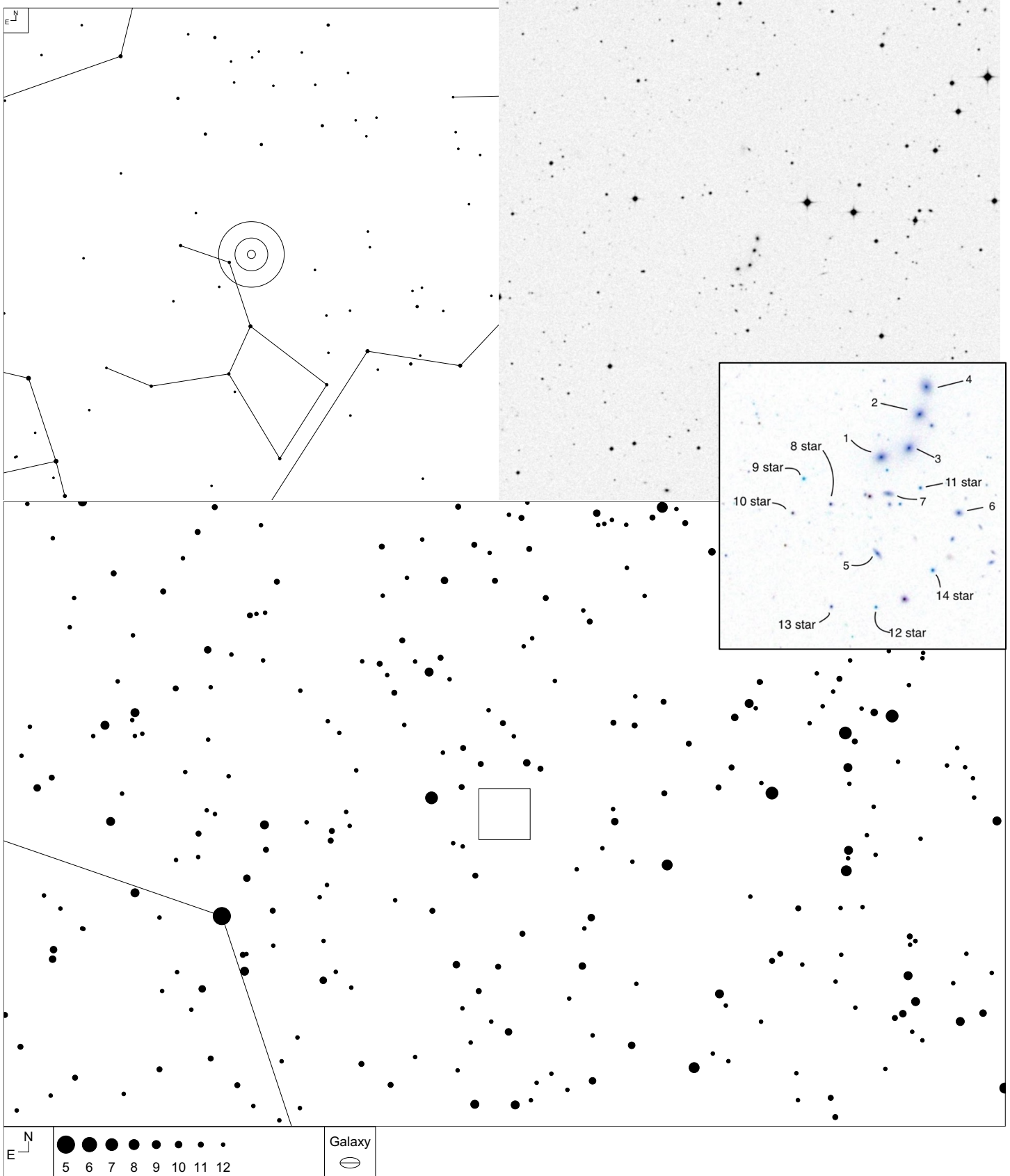
Object	RA	Dec	#	Mag	Size	Cmpt
	14 23 46	+06 35 05	7	16.1	2.6'	0.5

Shakhbazian 282 (Crater)



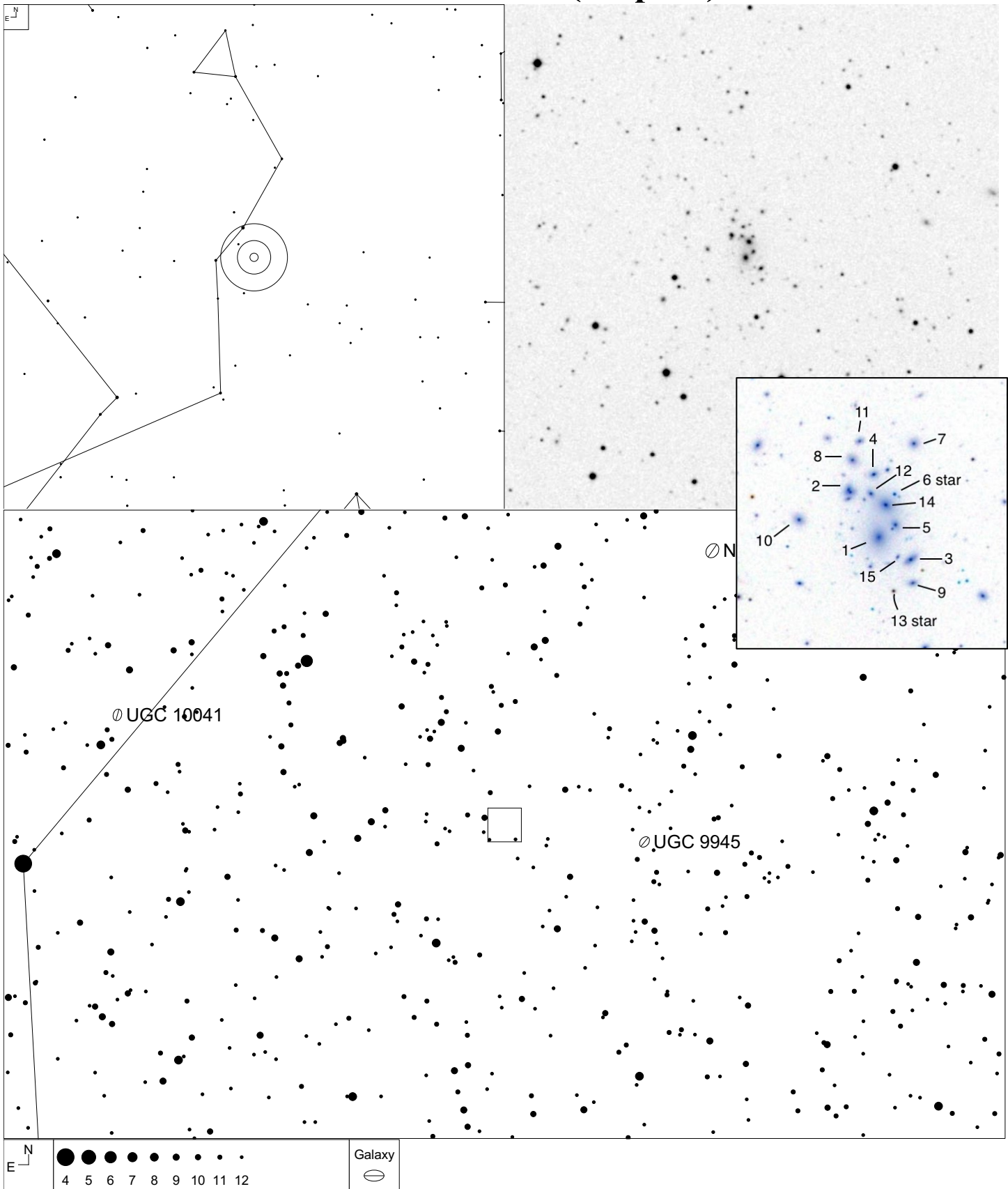
Object	RA	Dec	#	Mag	Size	Cmpt
	10 52 53	-11 00 28	8	18.21*	0.9'	0.6

Shakhbazian 285 (Crater)



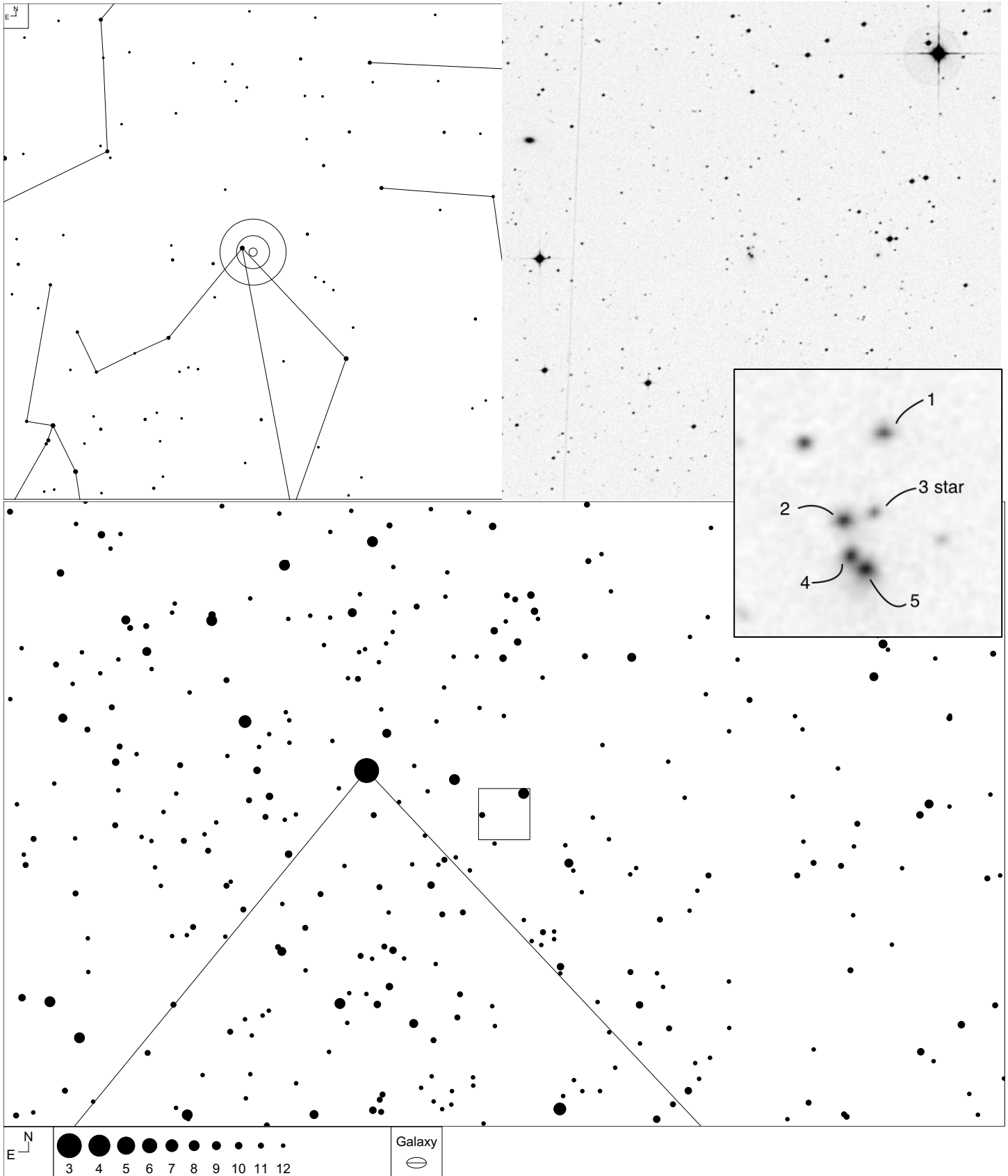
Object	RA	Dec	#	Mag	Size	Cmpt
	11 19 06	-10 22 23	14	18.35*	2.4'	0.3

Shakhbazian 360 (Serpens)



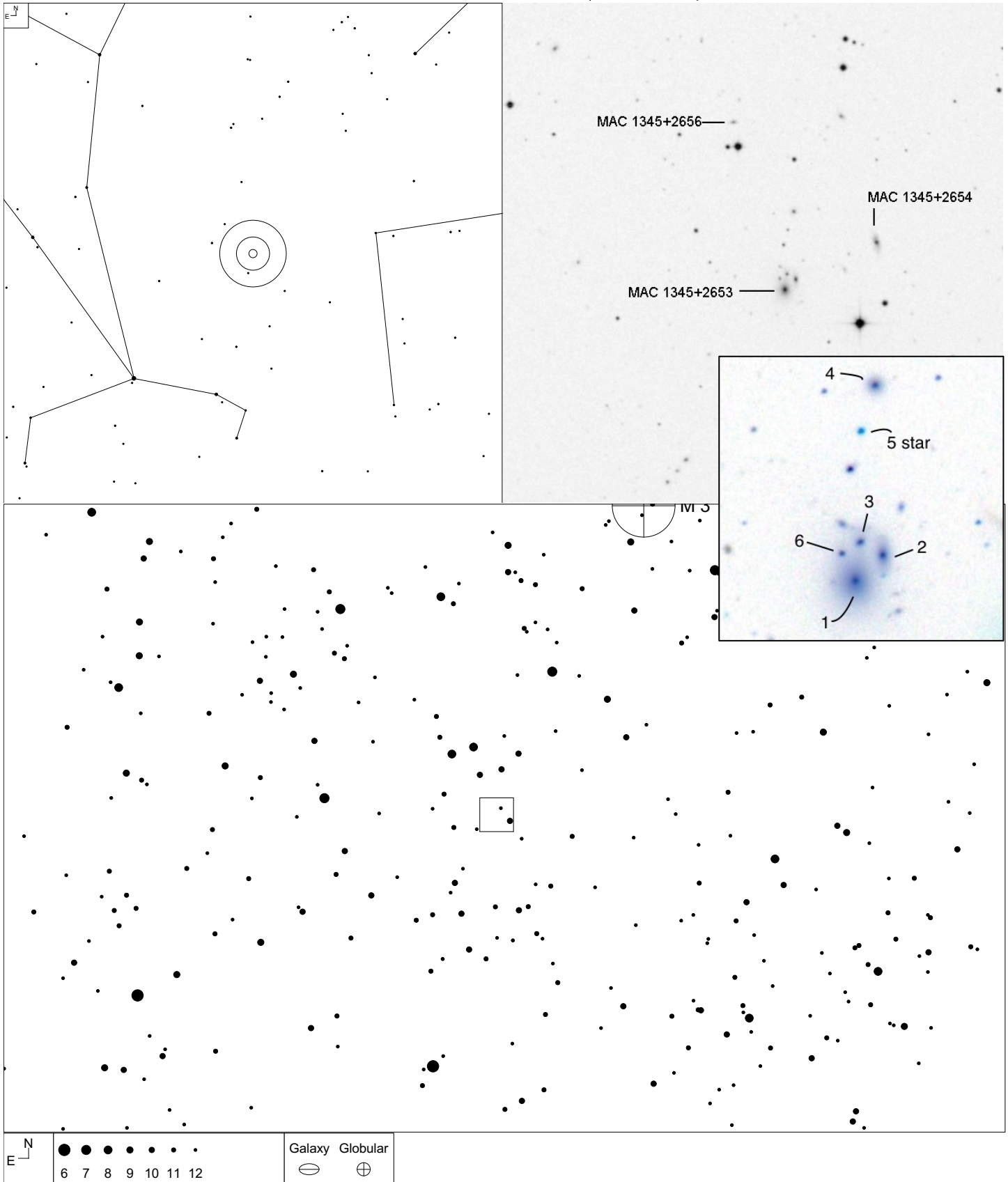
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 2113	15 41 27	+04 44 13	15	16.9	1.3'	1.2

Shakhbazian 330 (Libra)



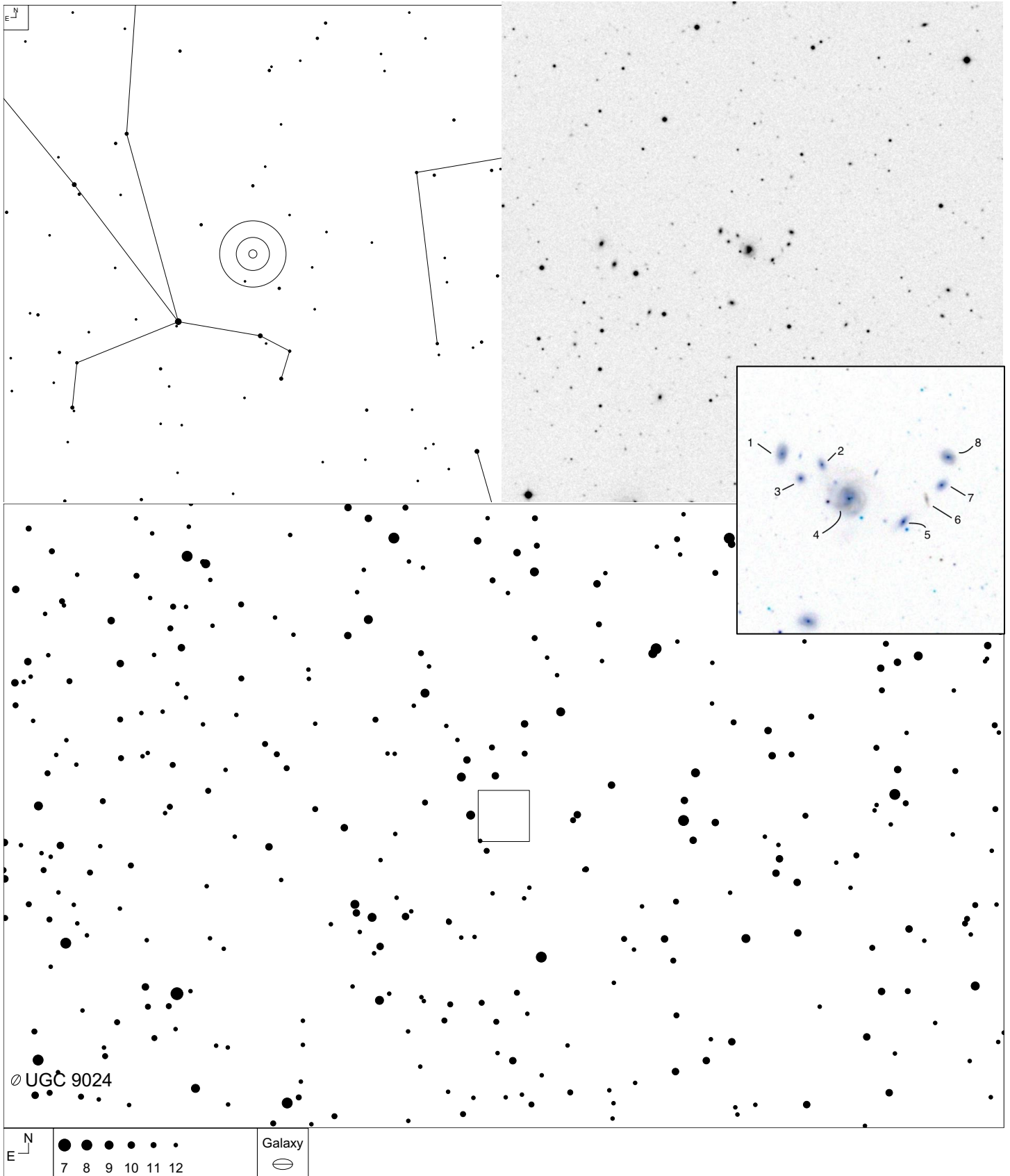
Object	RA	Dec	#	Mag	Size	Cmpt
	15 14 20	-09 35 35	5	18.08*	0.9'	0.5

Shakhbazian 213 (Boötes)

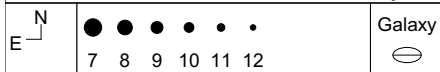


Object	RA	Dec	#	Mag	Size	Cmpt
MAC 1345+2653	13 45 12	+26 53 45	6	15.07*	1.9'	0.4

Shakhbazian 376 (Boötes)

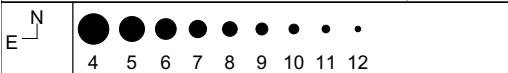
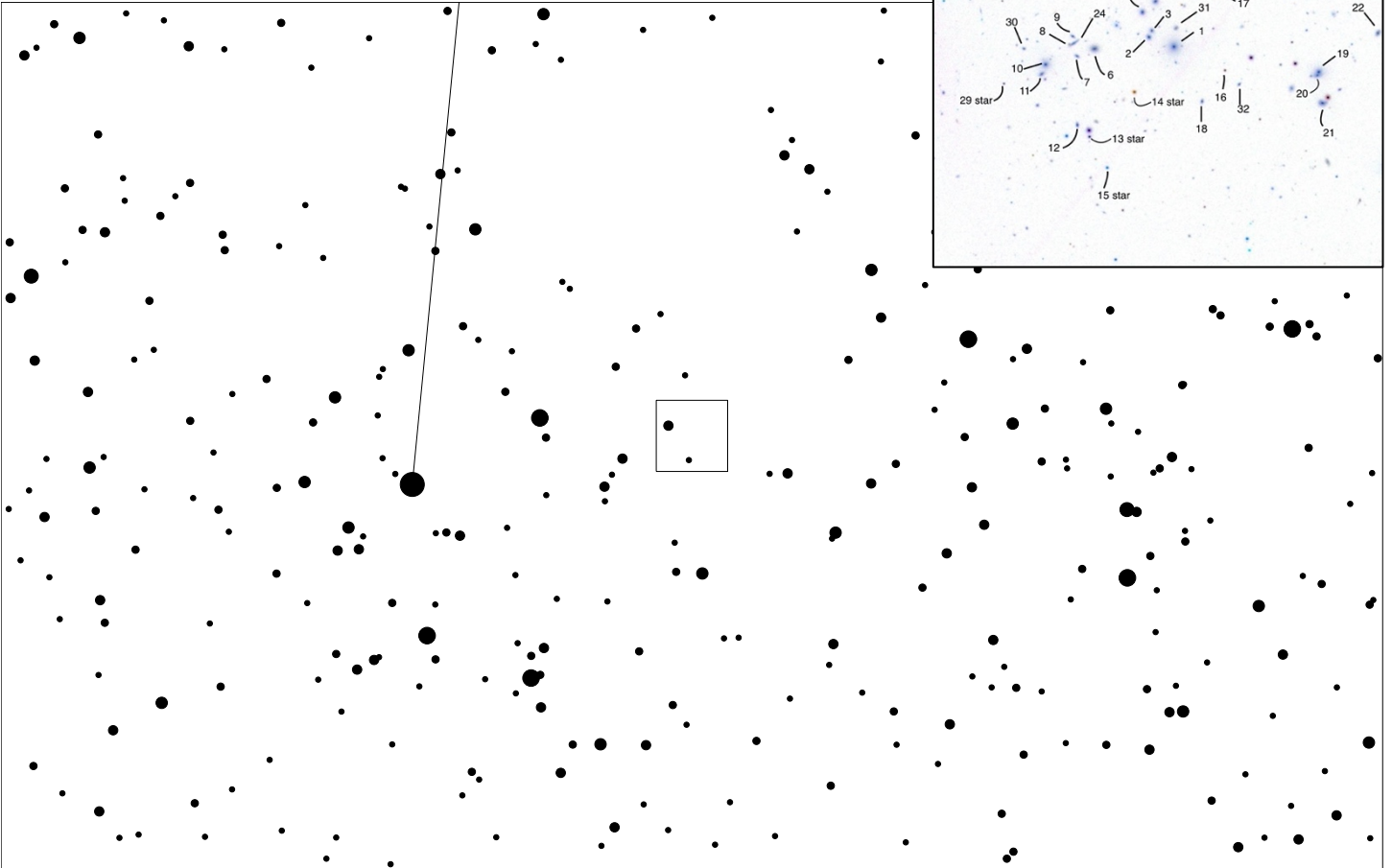
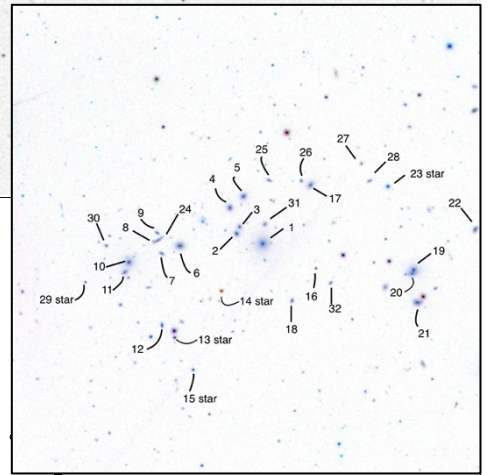
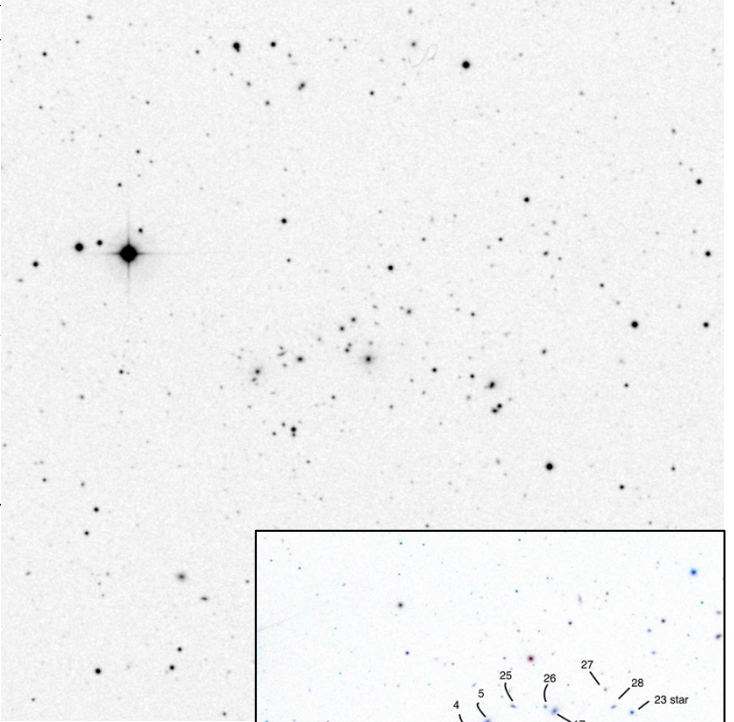
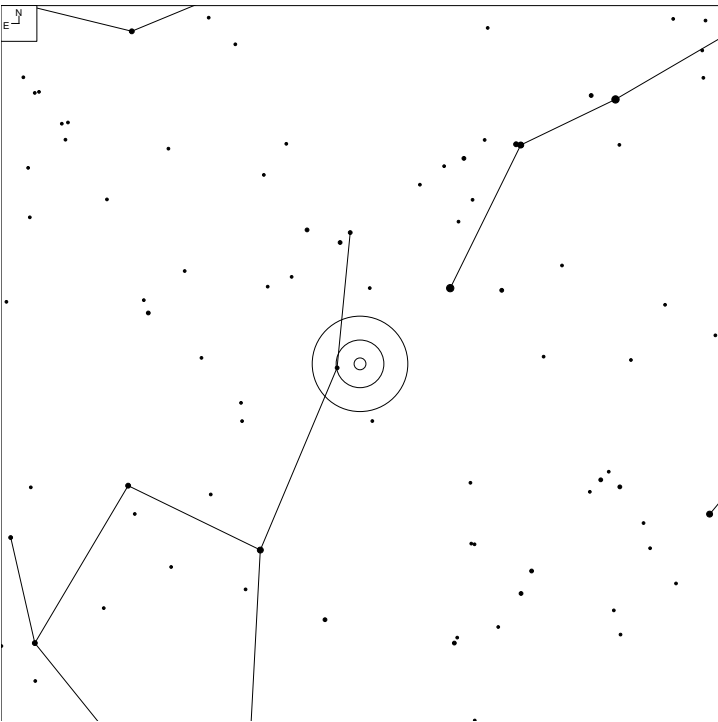


∅ UGC 9024



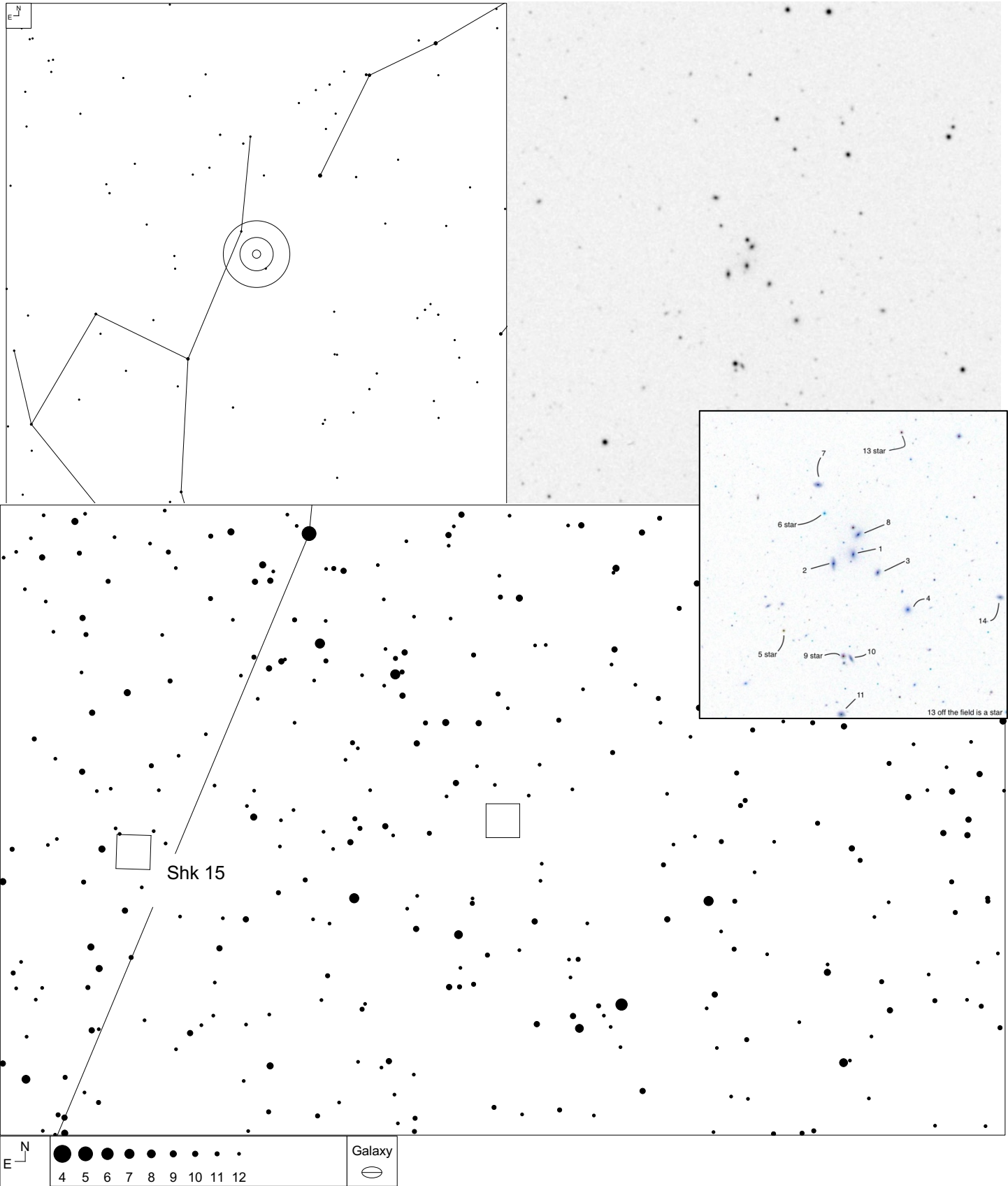
Object	RA	Dec	#	Mag	Size	Cmpt
	13 56 35	+23 21 31	8	16.9	1.9'	0.5

Shakhbazian 10 (Boötes)



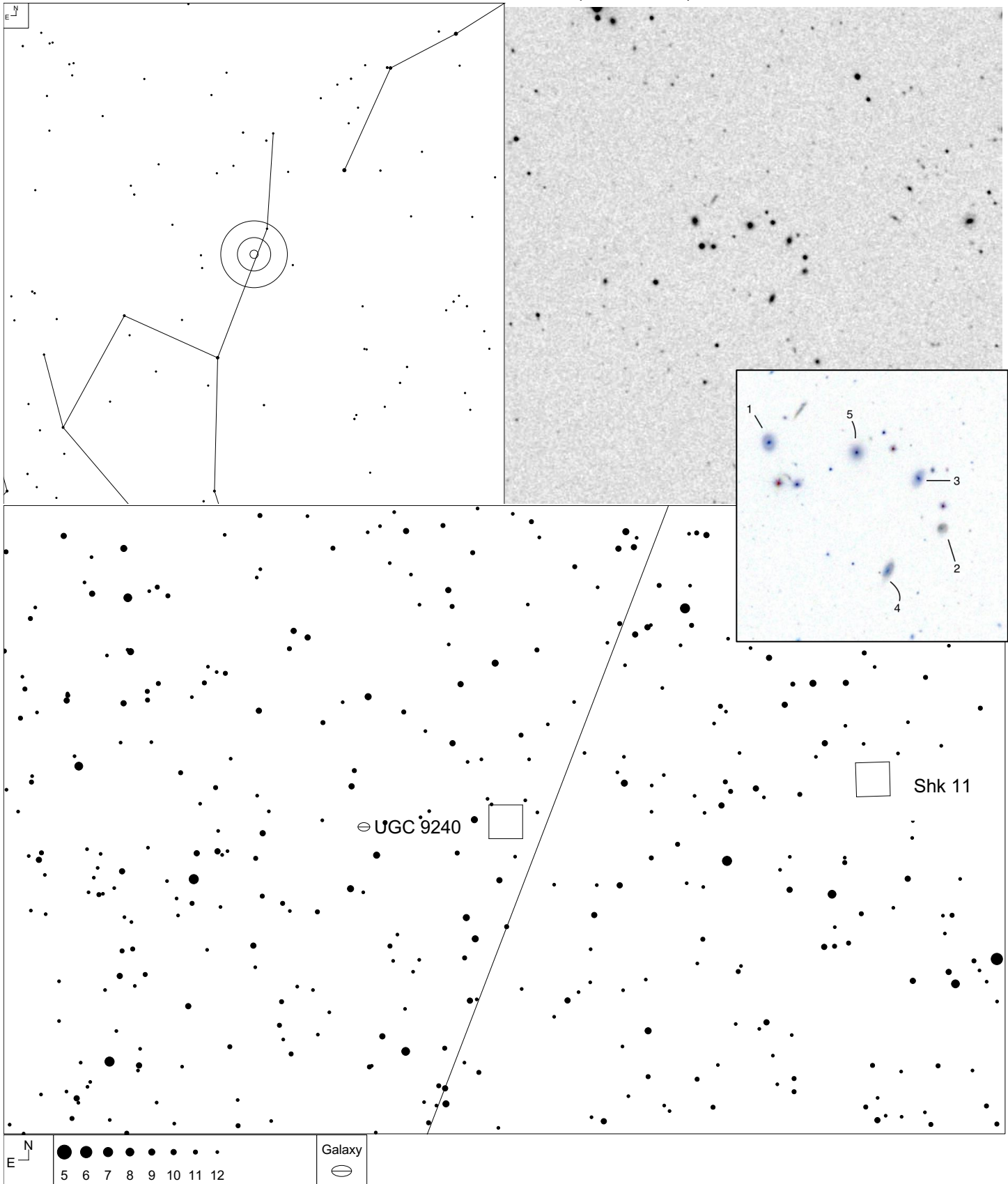
Object	RA	Dec	#	Mag	Size	Cmpt
	14 10 49	+46 15 54	32	17.5	4'	1.8

Shakhbazian 11 (Boötes)



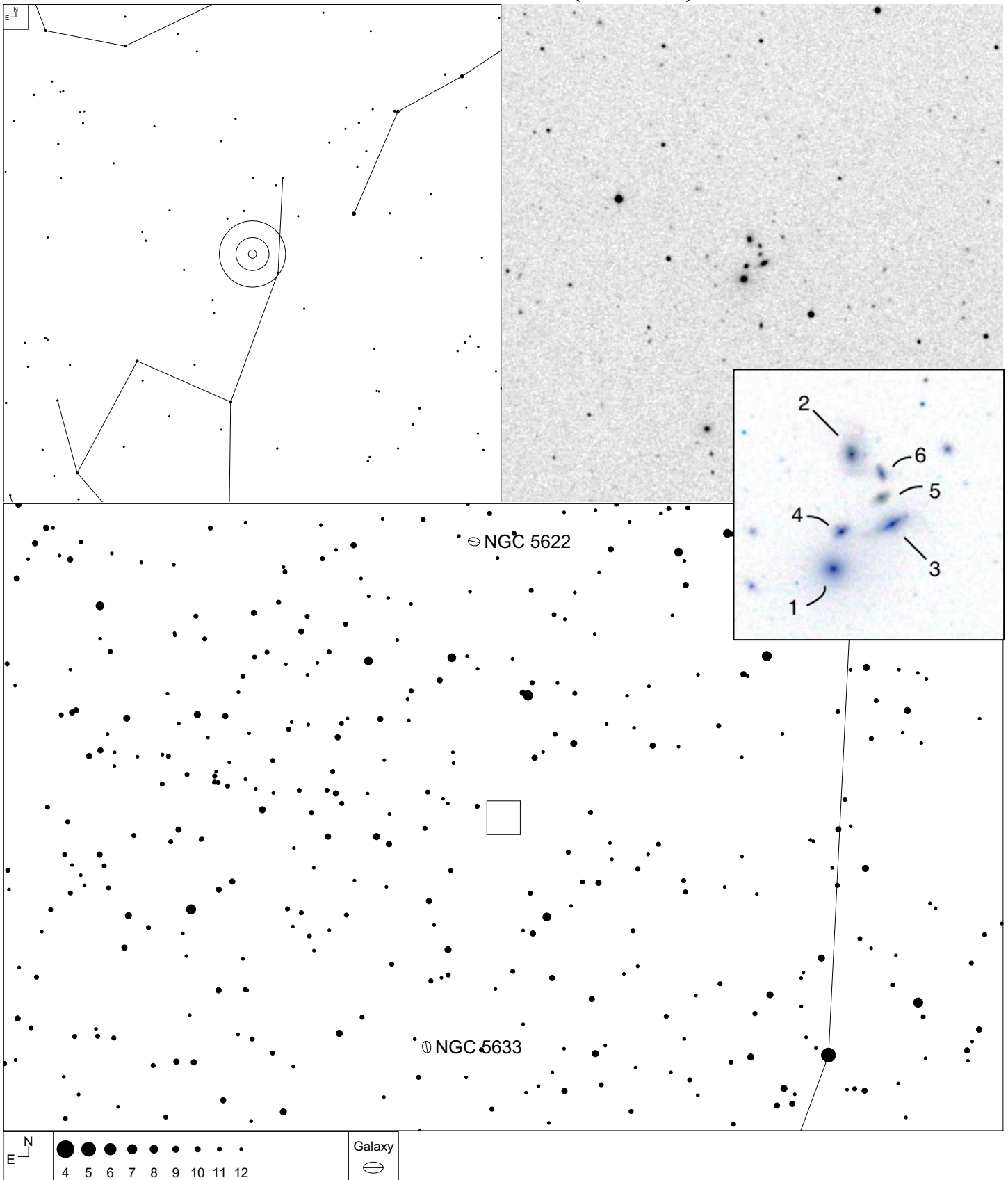
Object	RA	Dec	#	Mag	Size	Cmpt
	14 11 08	+44 43 21	14	17.7	2.8'	0.4

Shakhbazian 15 (Boötes)



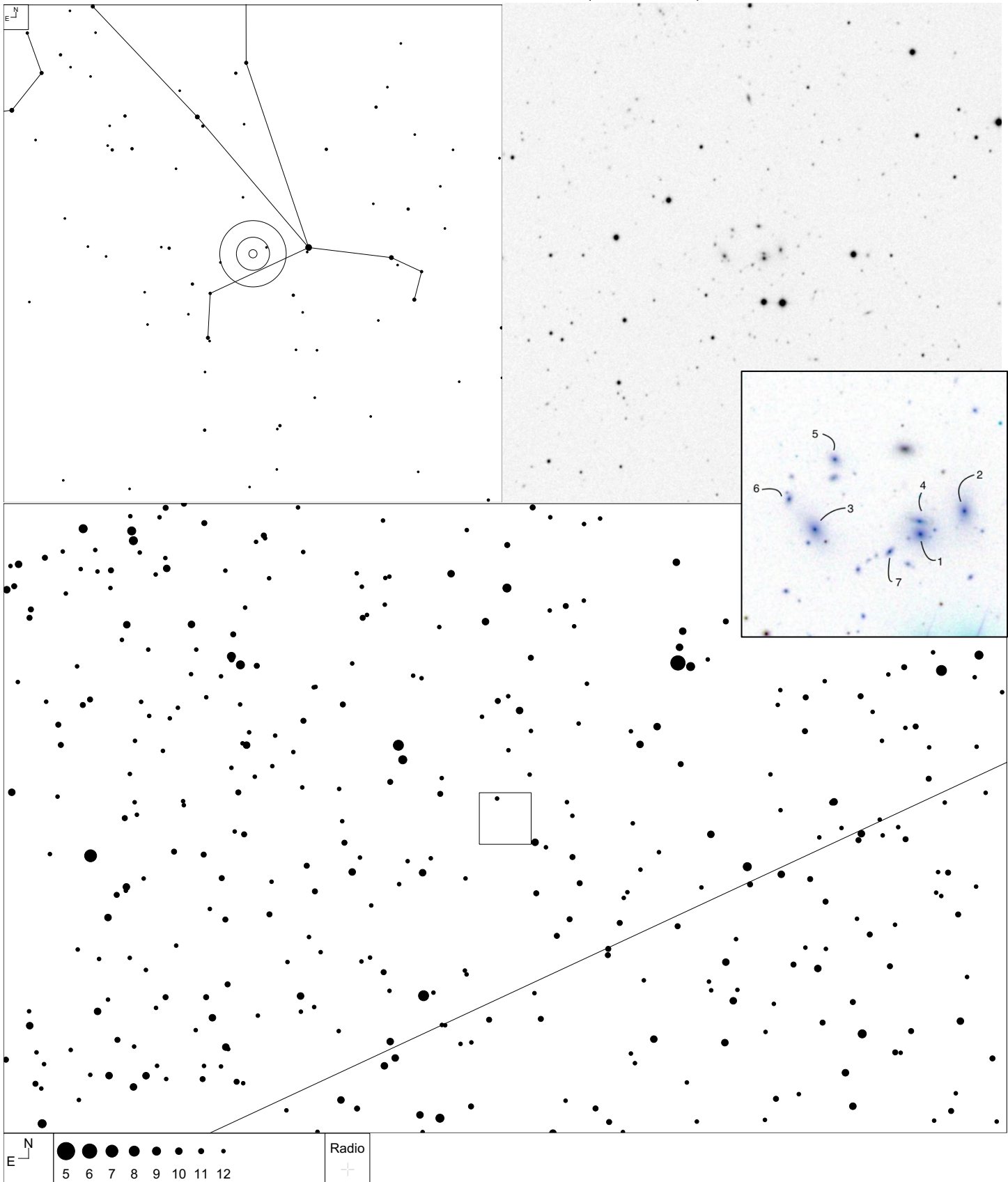
Object	RA	Dec	#	Mag	Size	Cmpt
	14 20 56	+44 33 19	5	16.8	2.3'	0.6

Shakhbazian 14 (Boötes)



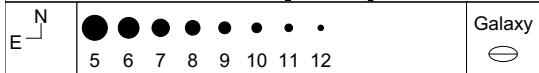
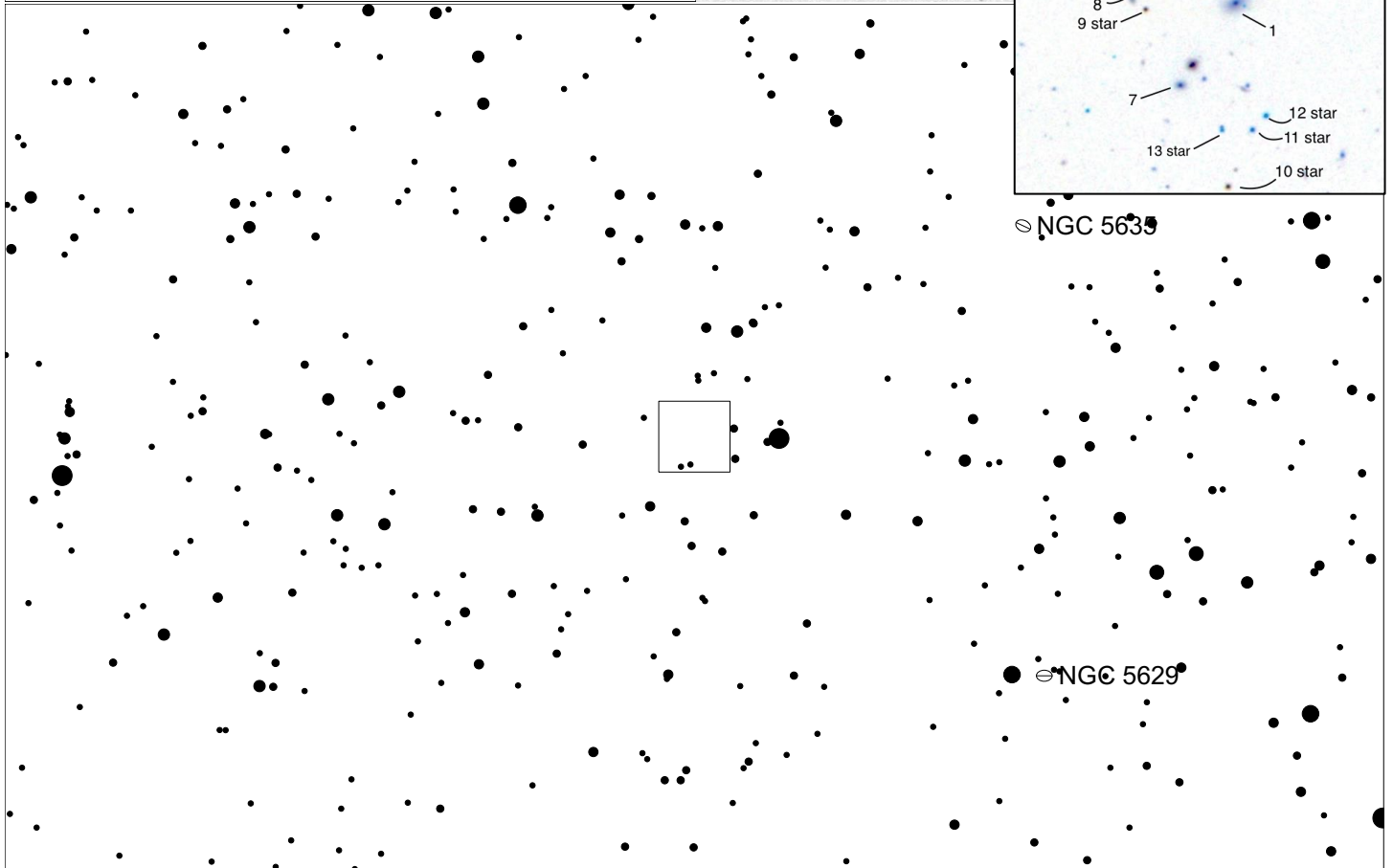
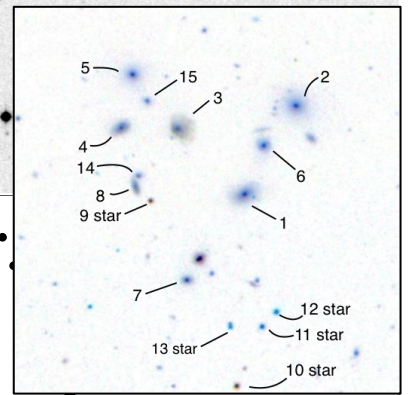
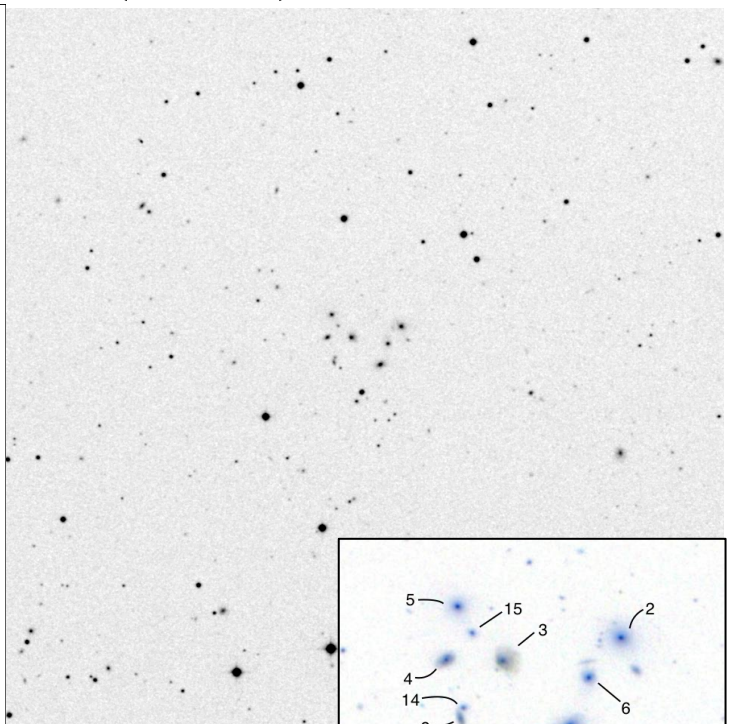
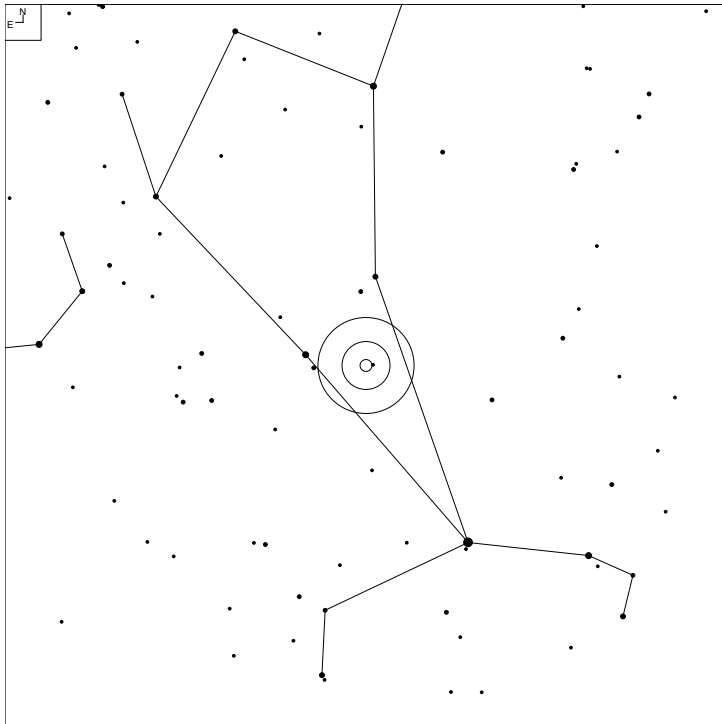
Object	RA	Dec	#	Mag	Size	Cmpt
	14 25 21	+47 14 45	6	16.6	0.9'	0.9

Shakhbazian 359 (Boötes)



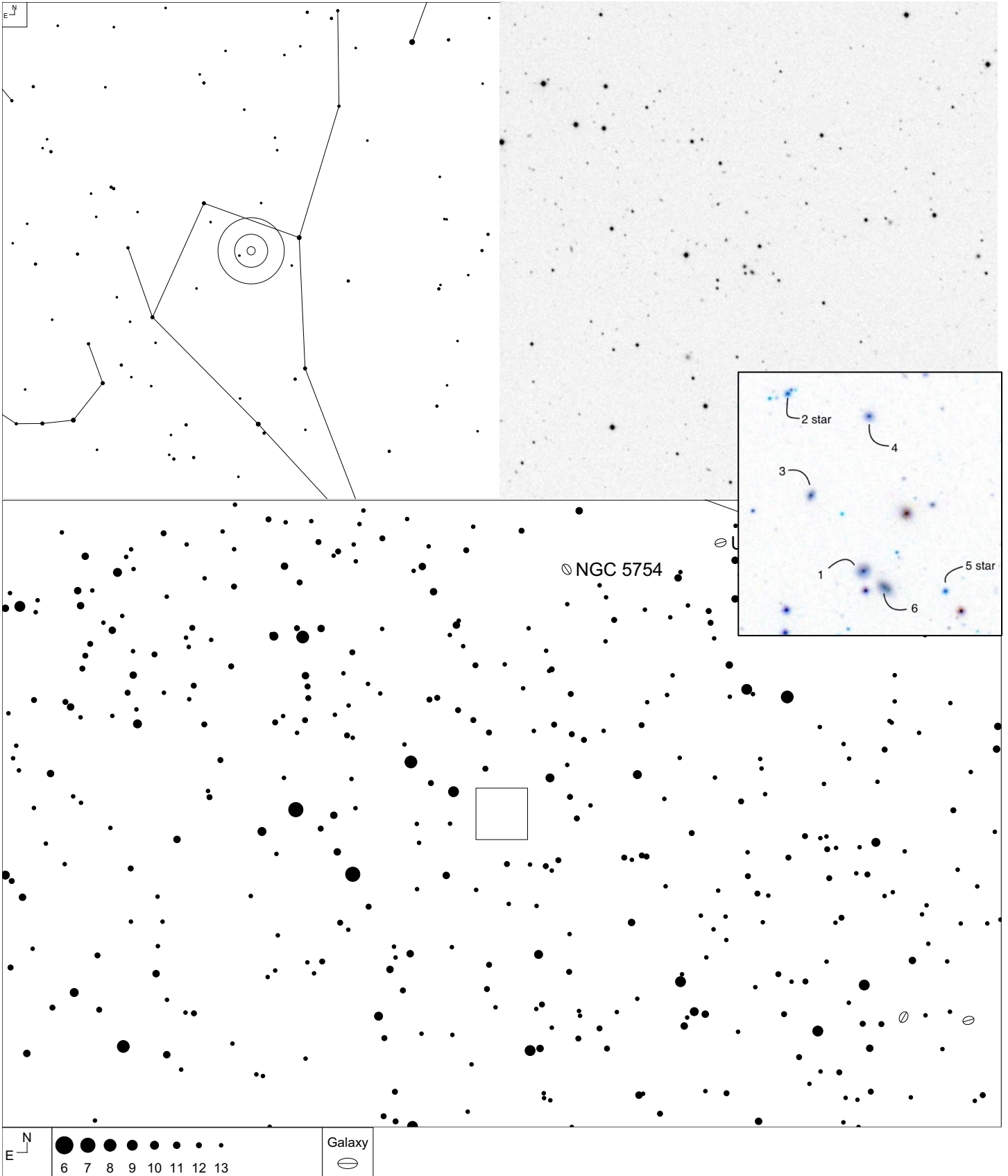
Object	RA	Dec	#	Mag	Size	Cmpt
	14 29 56	+18 50 16	7	16.78	2	0.4

Shakhbazian 218 (Boötes)



Object	RA	Dec	#	Mag	Size	Cmpt
	14 33 39	+26 41 03	15	17.3	3.1'	0.4

Shakhbazian 257 (Boötes)

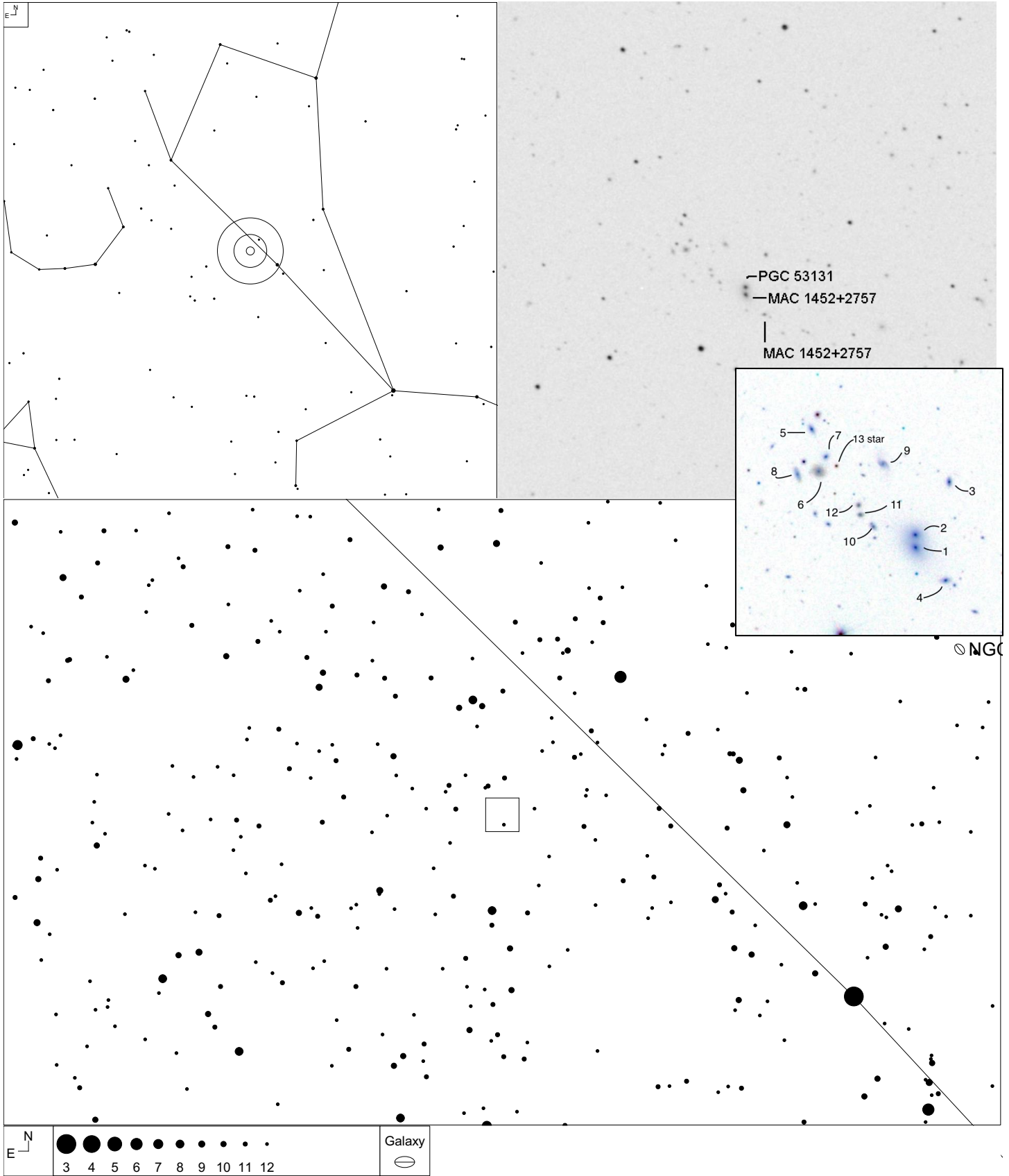


NGC 5754



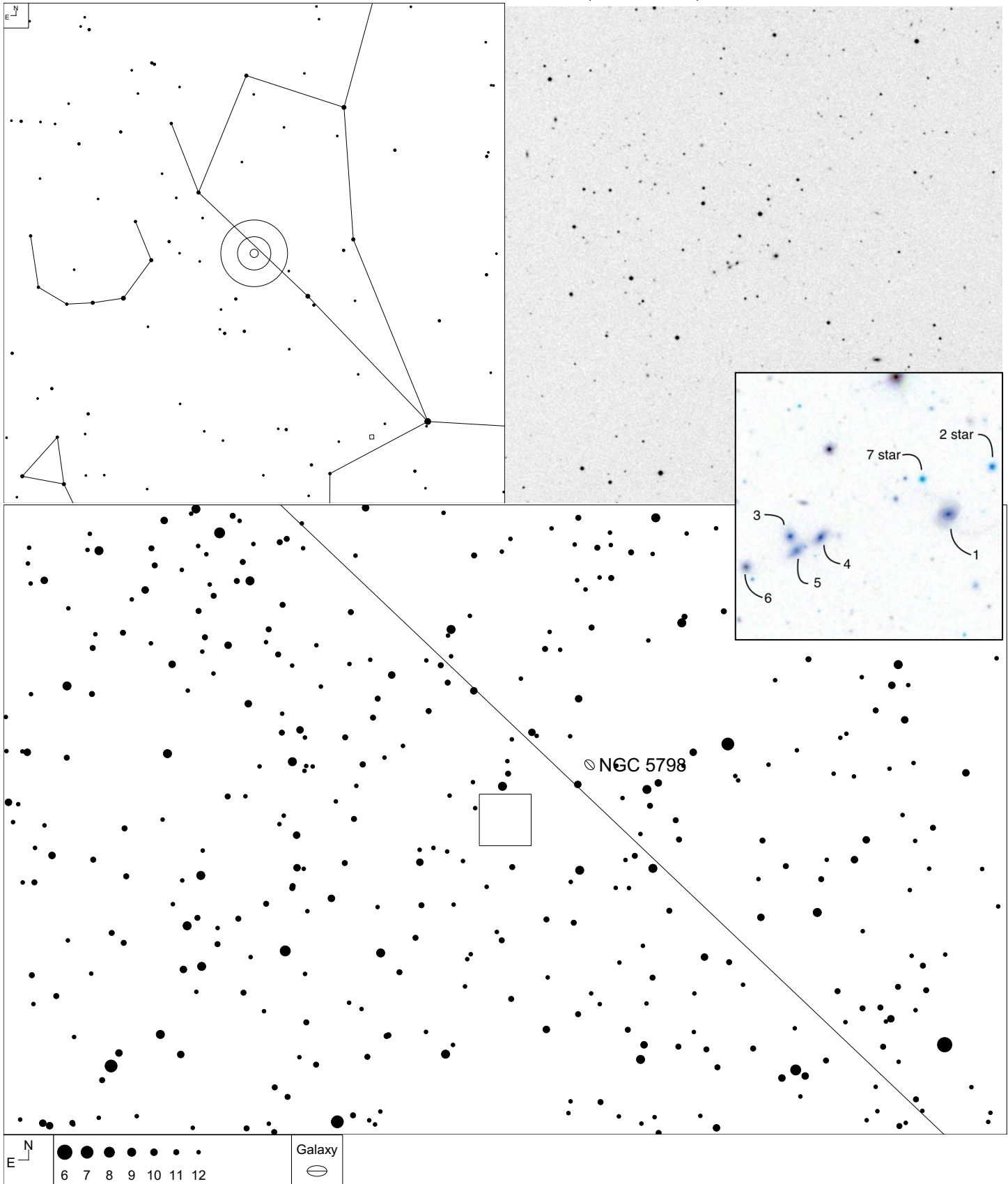
Object	RA	Dec	#	Mag	Size	Cmpt
	14 46 55	+37 33 50	6	17.64	2.68	0.3

Shakhbazian 219 (Boötes)



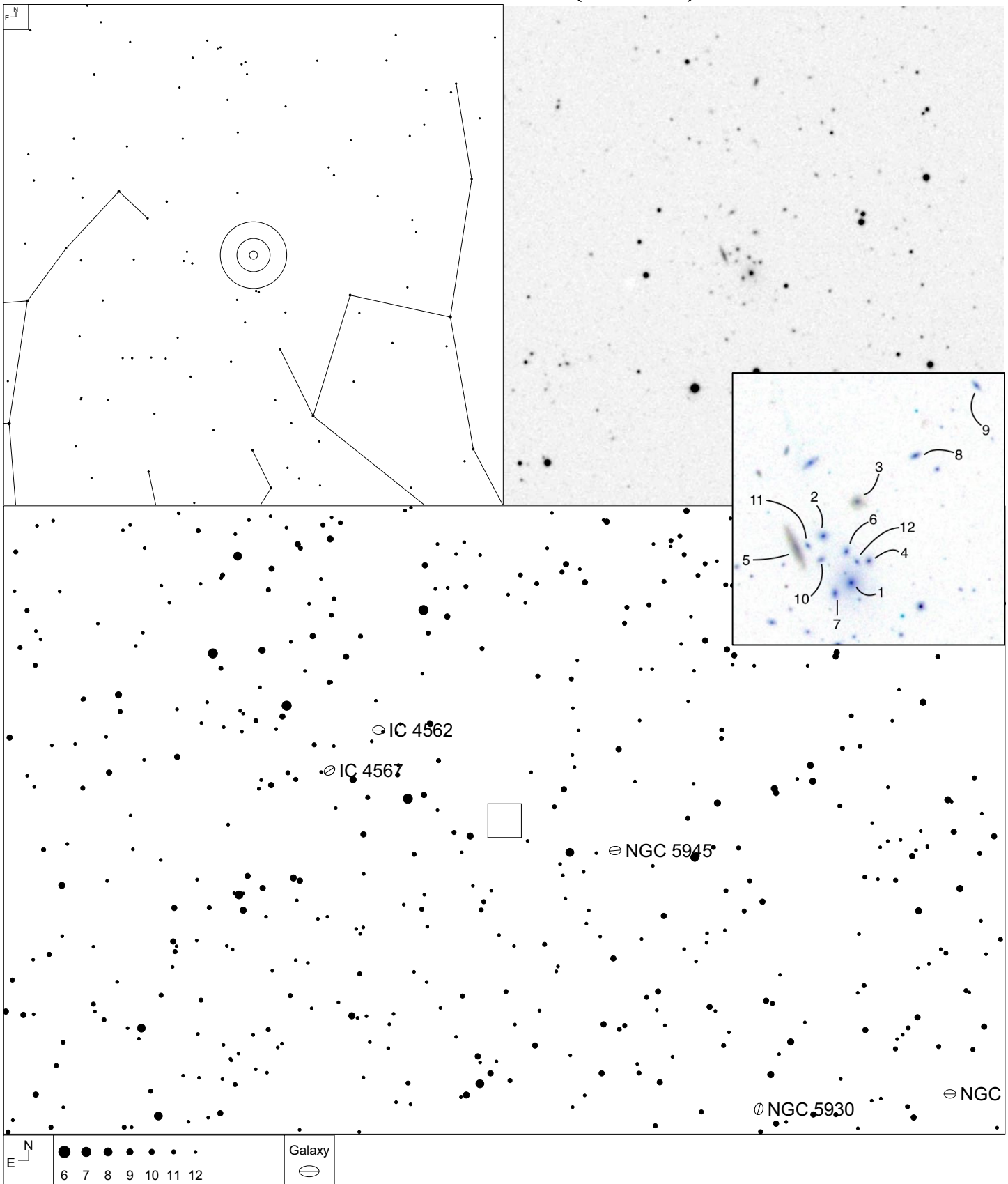
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 1984	14 52 36	+27 58 25	13	17.0	2.7'	0.4

Shakhbazian 220 (Boötes)



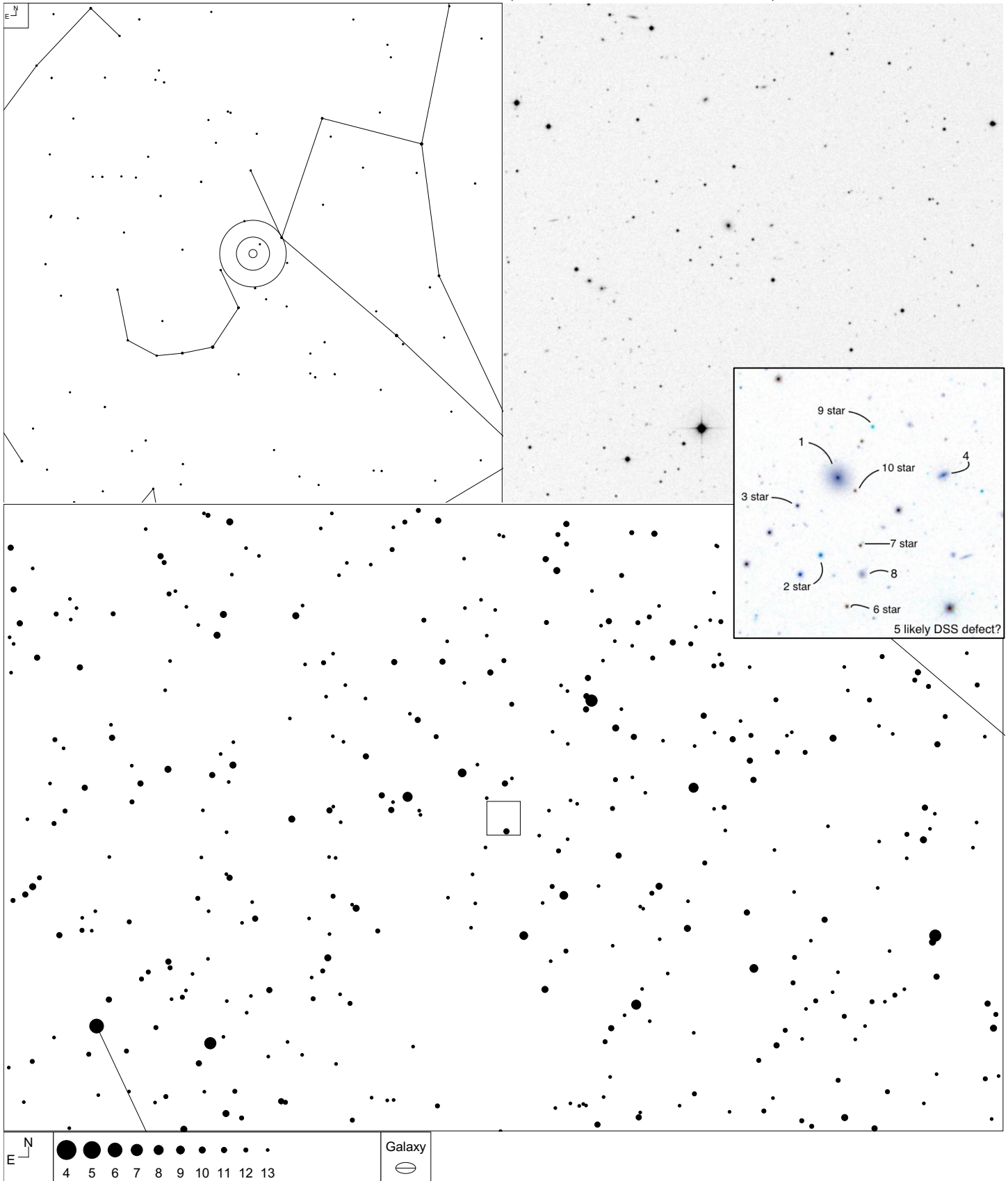
Object	RA	Dec	#	Mag	Size	Cmpt
	14 59 29	+29 42 27	7	17.15	2.7	0.2

Shakhbazian 79 (Boötes)



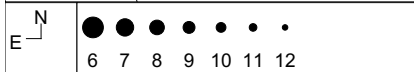
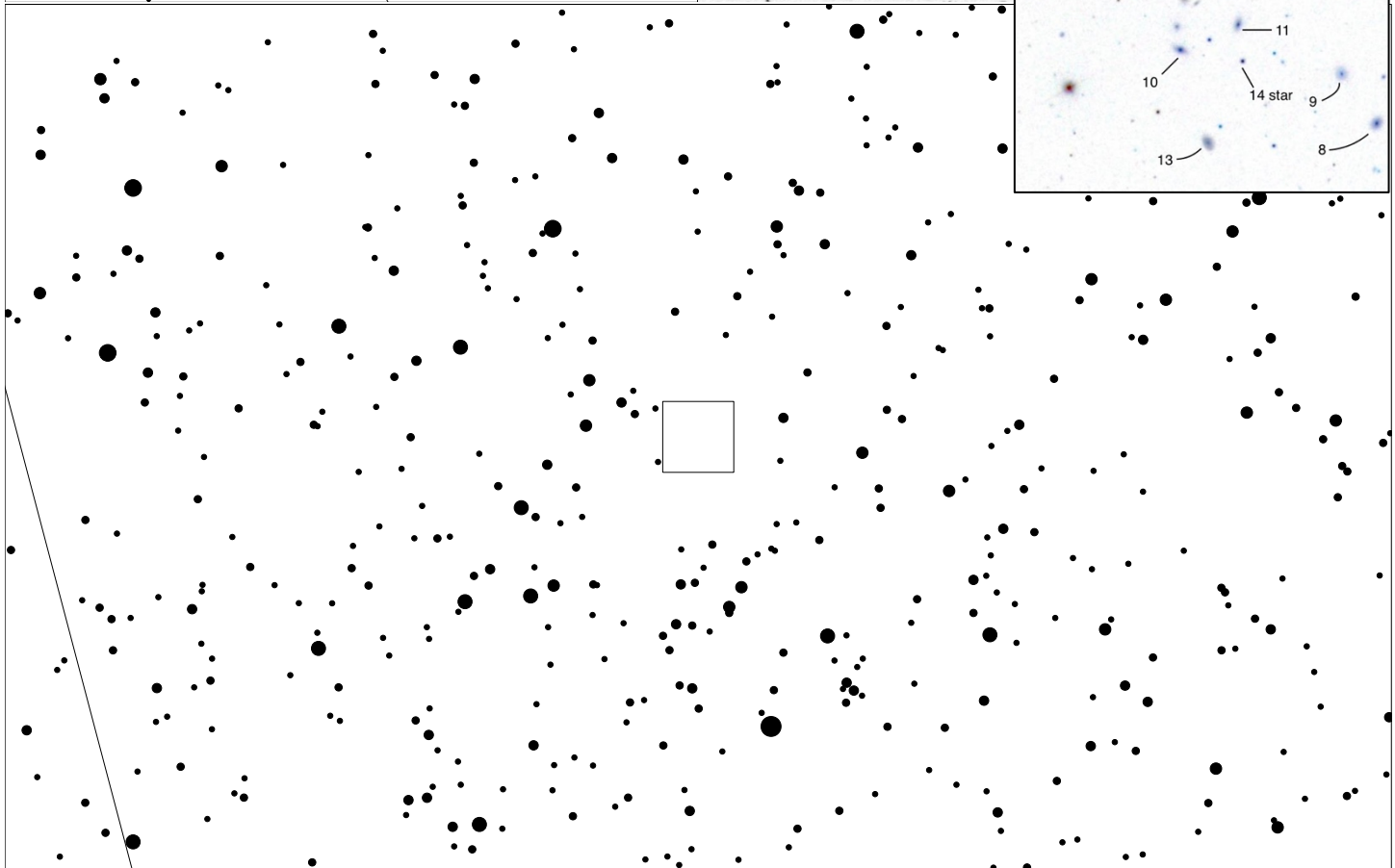
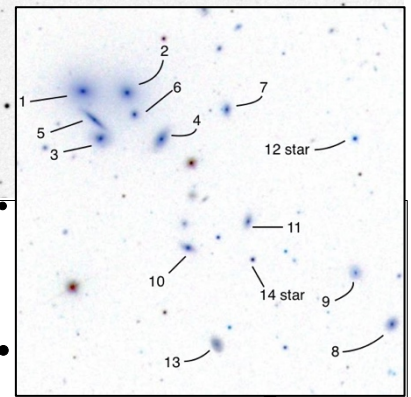
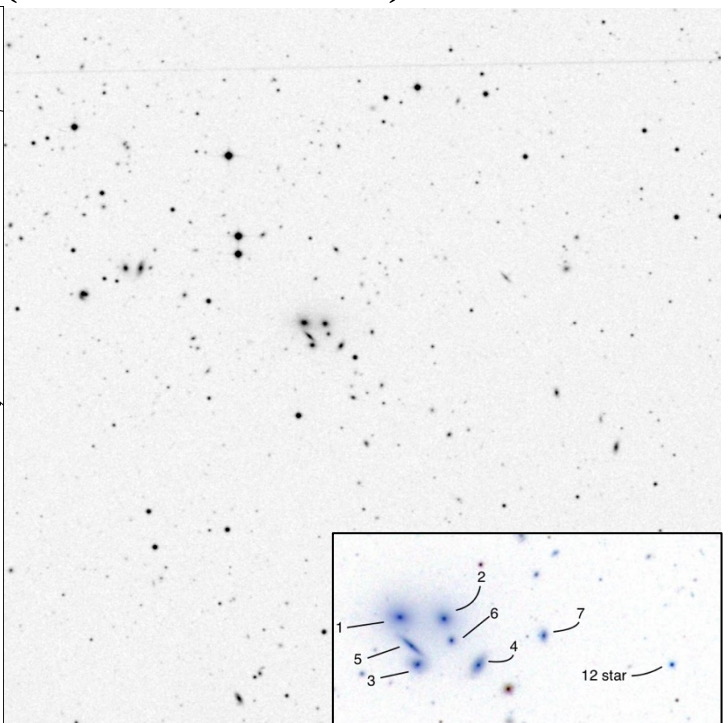
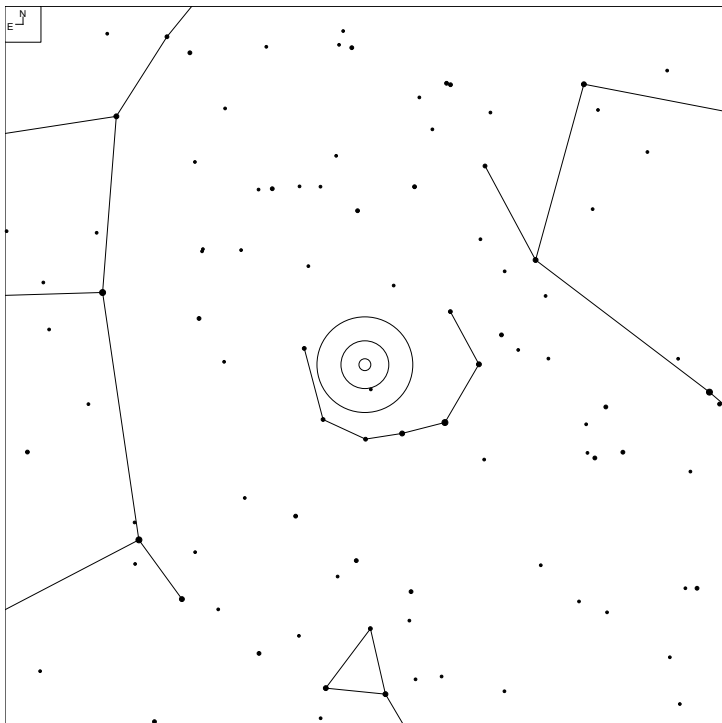
Object	RA	Dec	#	Mag	Size	Cmpt
	15 32 38	+43 03 56	12	17.5	1.0'	0.9

Shakhbazian 258 (Corona Borealis)



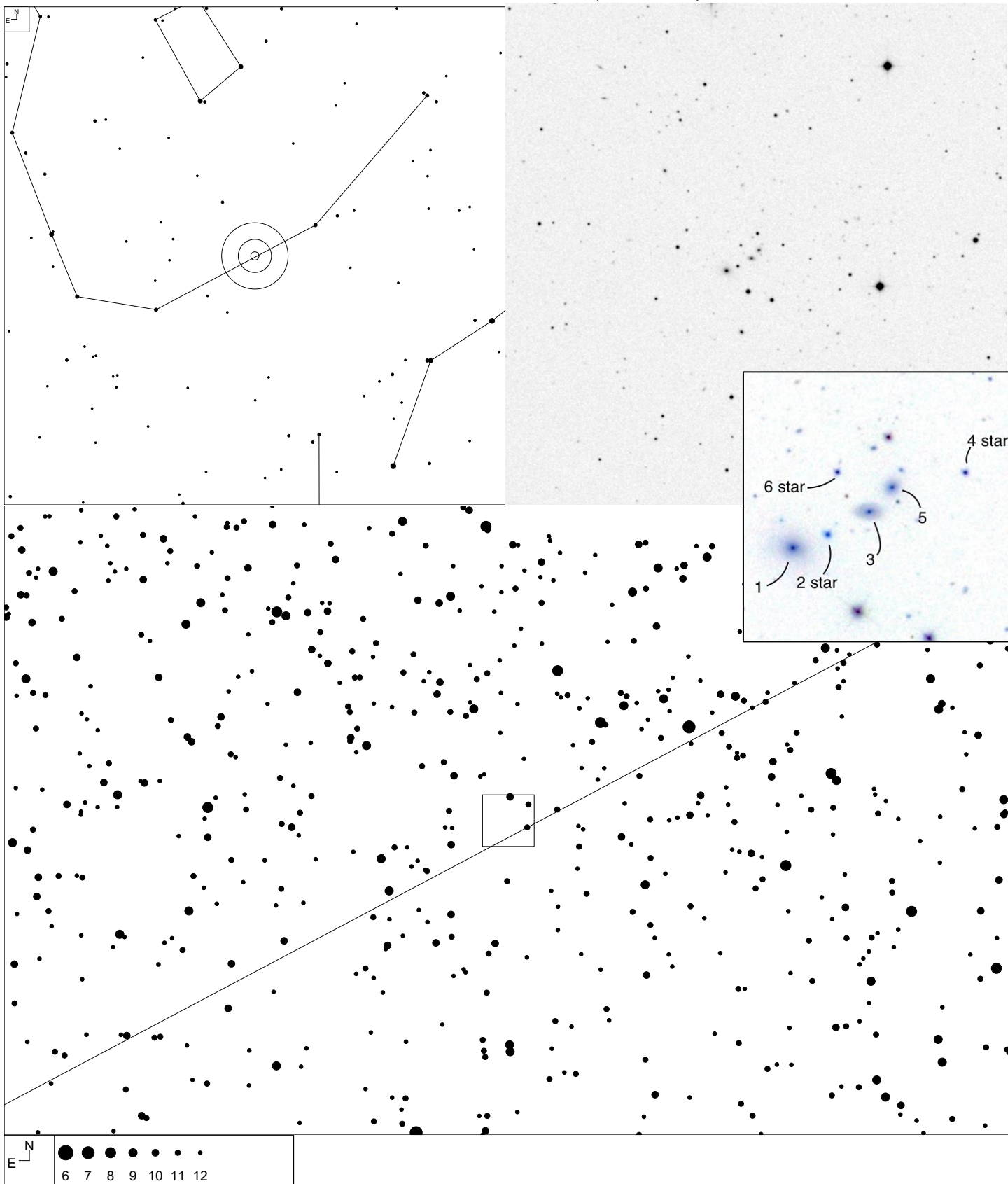
Object	RA	Dec	#	Mag	Size	Cmpt
	15 23 40	+32 24 00	10	17.11*	2.22'	0.3

Shakhbazian 223 (Corona Borealis)



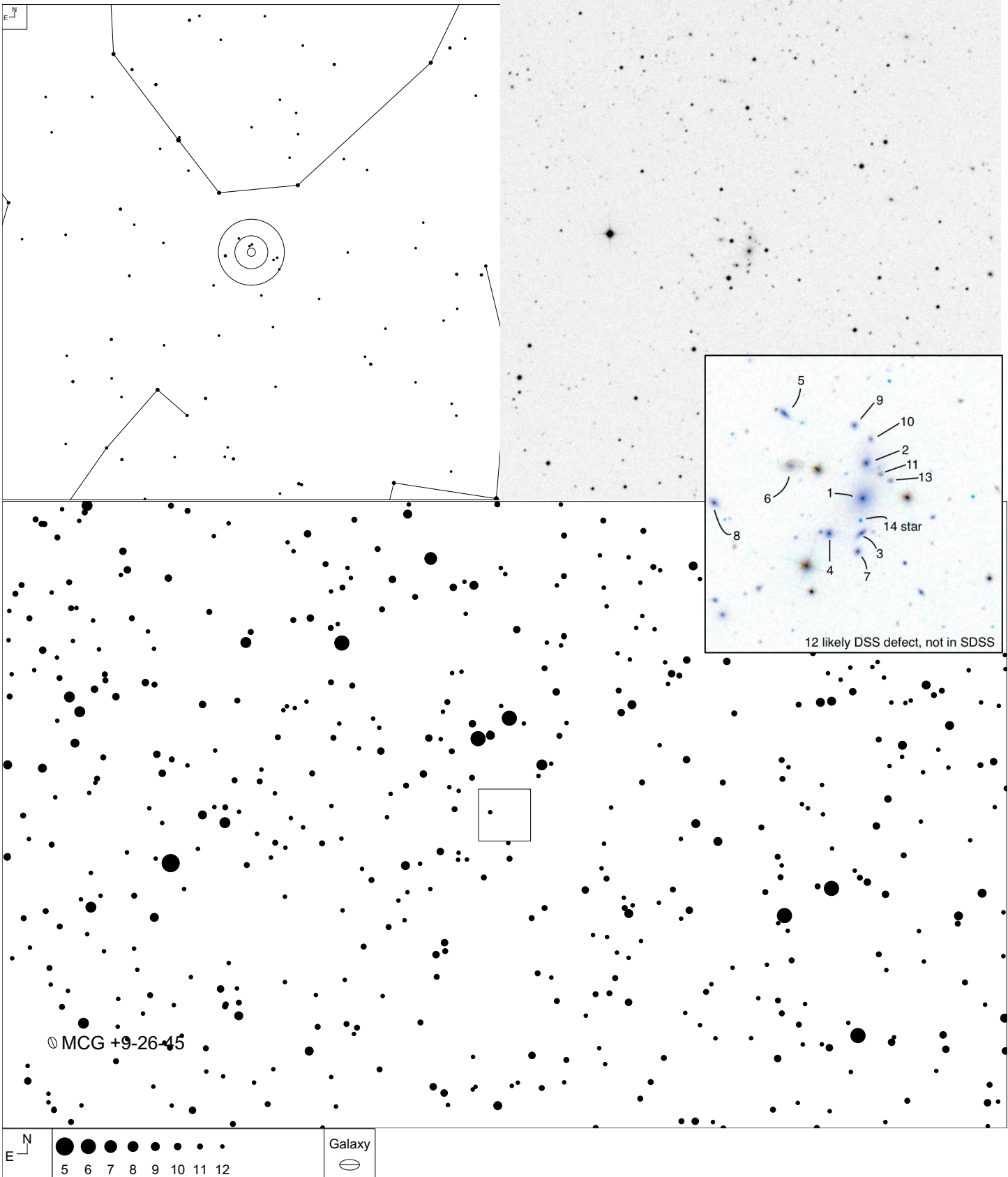
Object	RA	Dec	#	Mag	Size	Cmpt
	15 49 43	+29 09 38	14	15.8*	4'	0.4

Shakhbazian 131 (Draco)



Object	RA	Dec	#	Mag	Size	Cmpt
	14 38 09	+62 44 10	6	16.7	1.9'	0.4

Shakhbazian 20 (Draco)

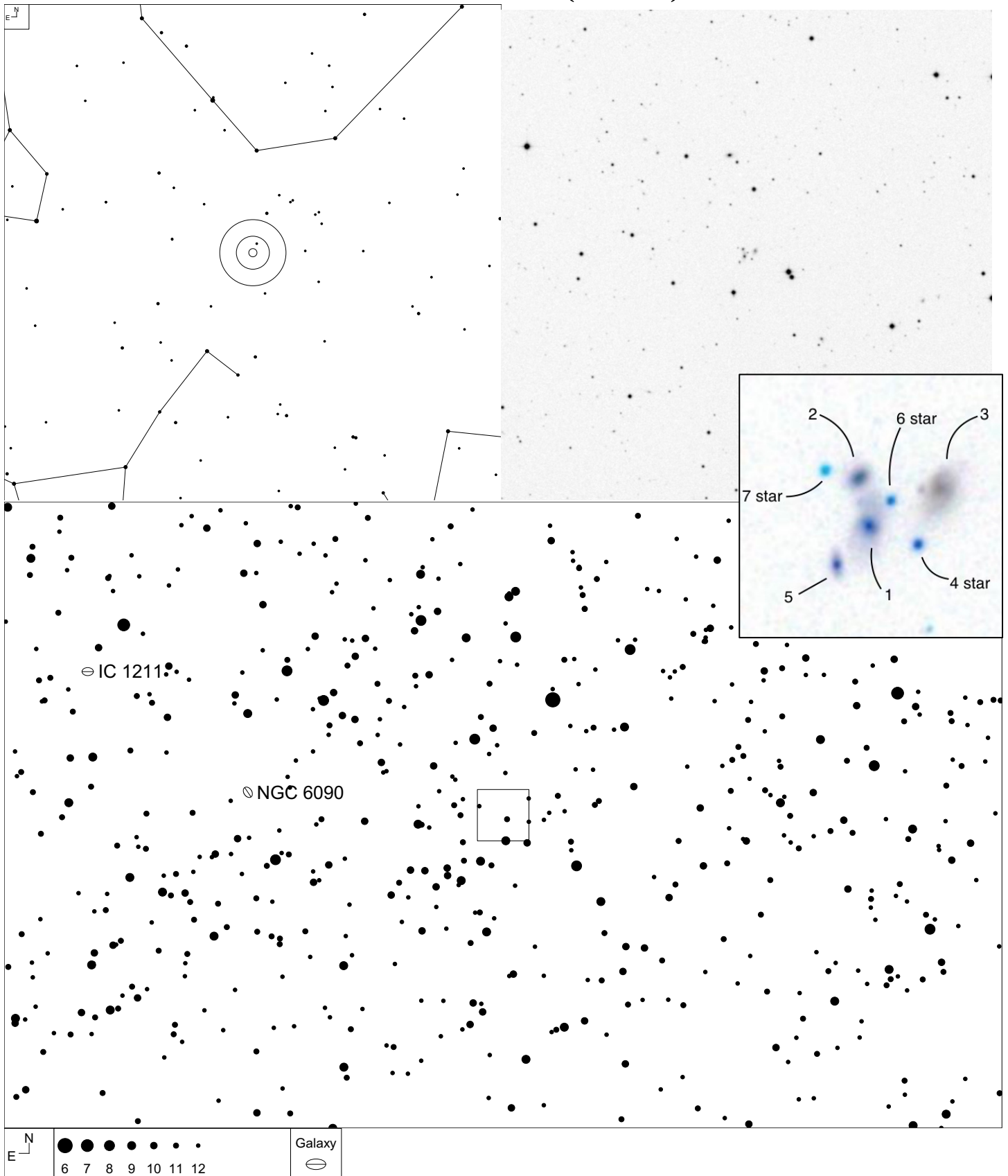


⊙ MCG +9-26-45

12 likely DSS defect, not in SDSS

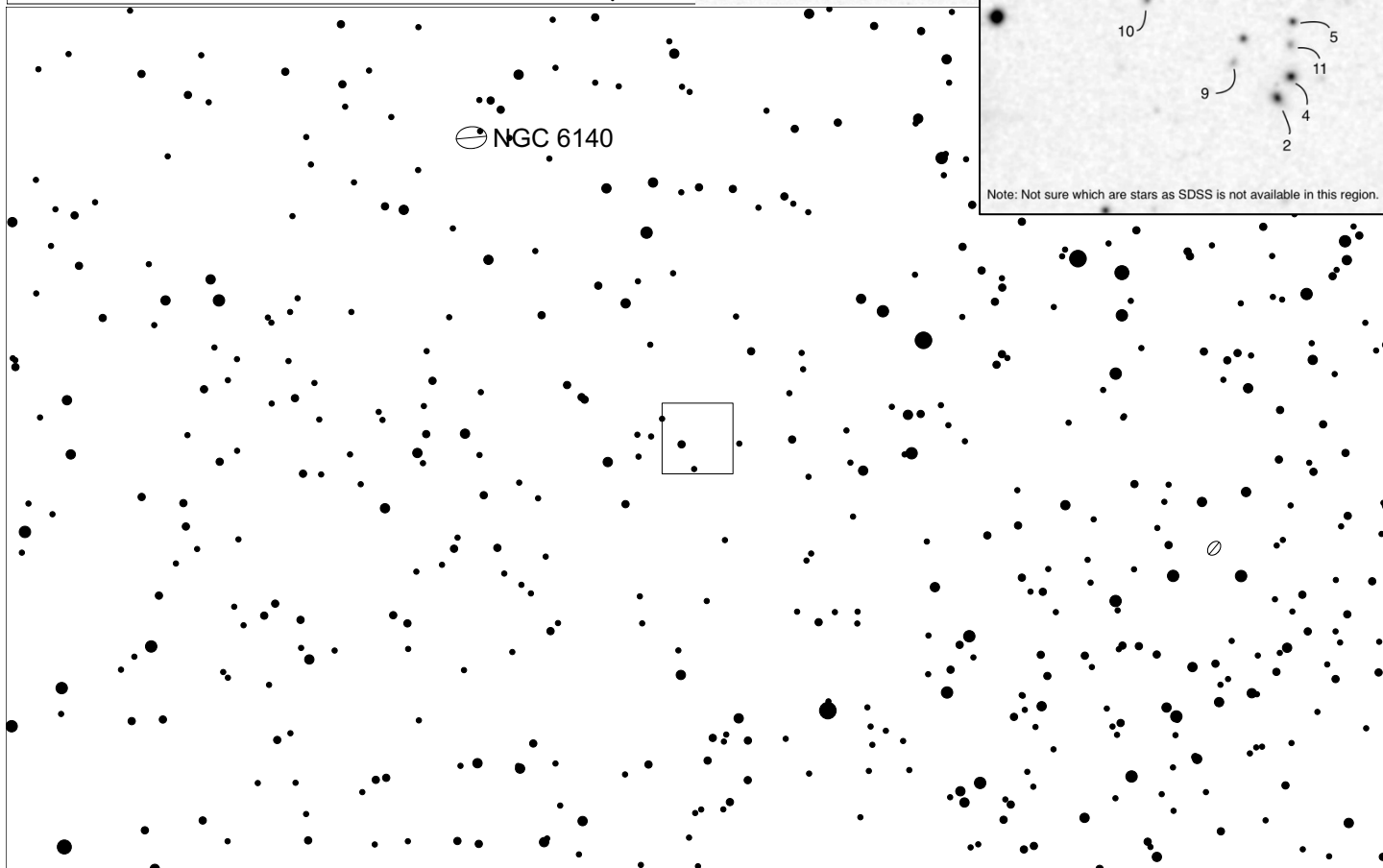
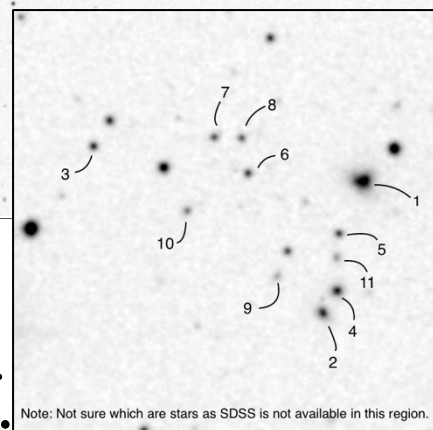
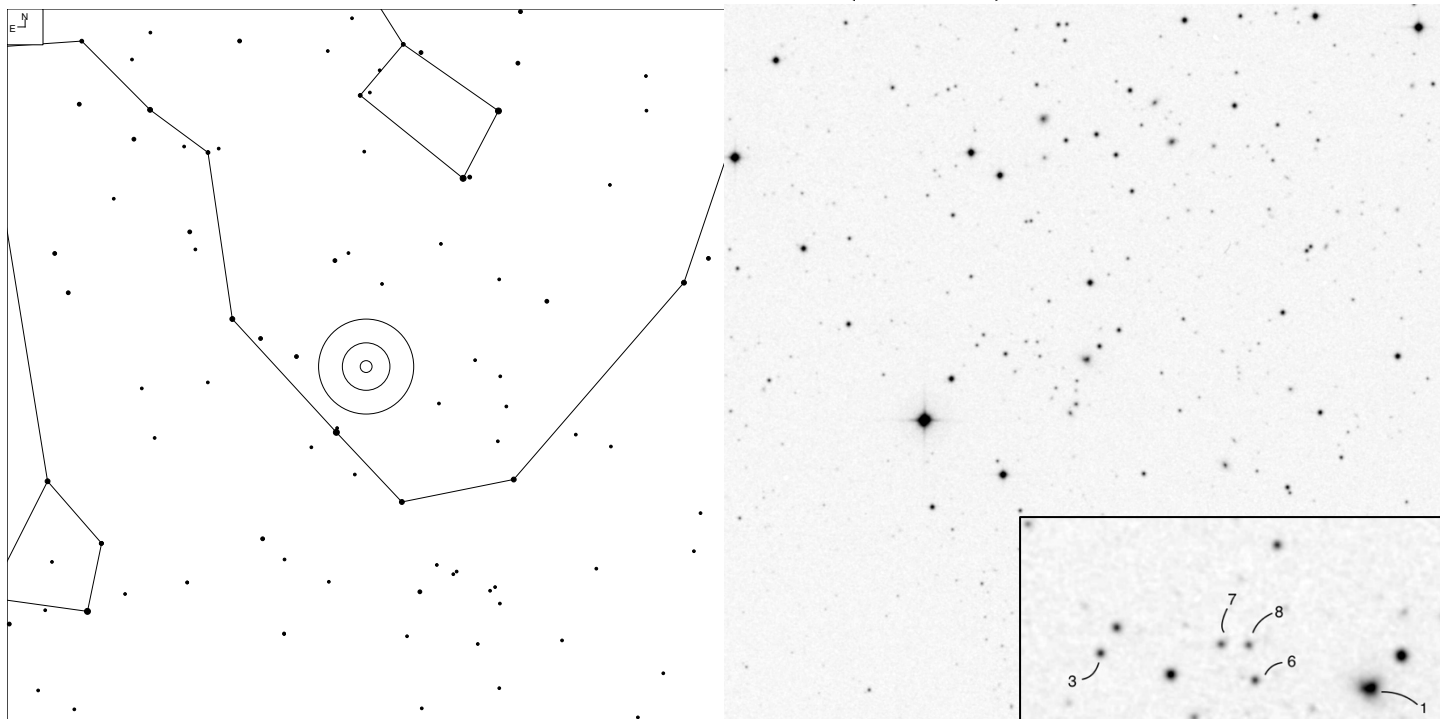
Object	RA	Dec	#	Mag	Size	Cmpt
	15 46 44	+55 00 49	14	17.0	2.5'	0.9

Shakhbazian 8 (Draco)



Object	RA	Dec	#	Mag	Size	Cmpt
	16 03 40	+52 21 50	7	17.5	0.6'	0.9

Shakhbazian 135 (Draco)

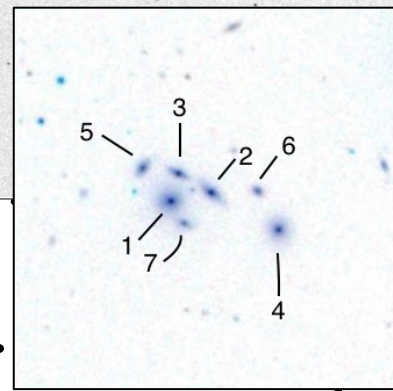
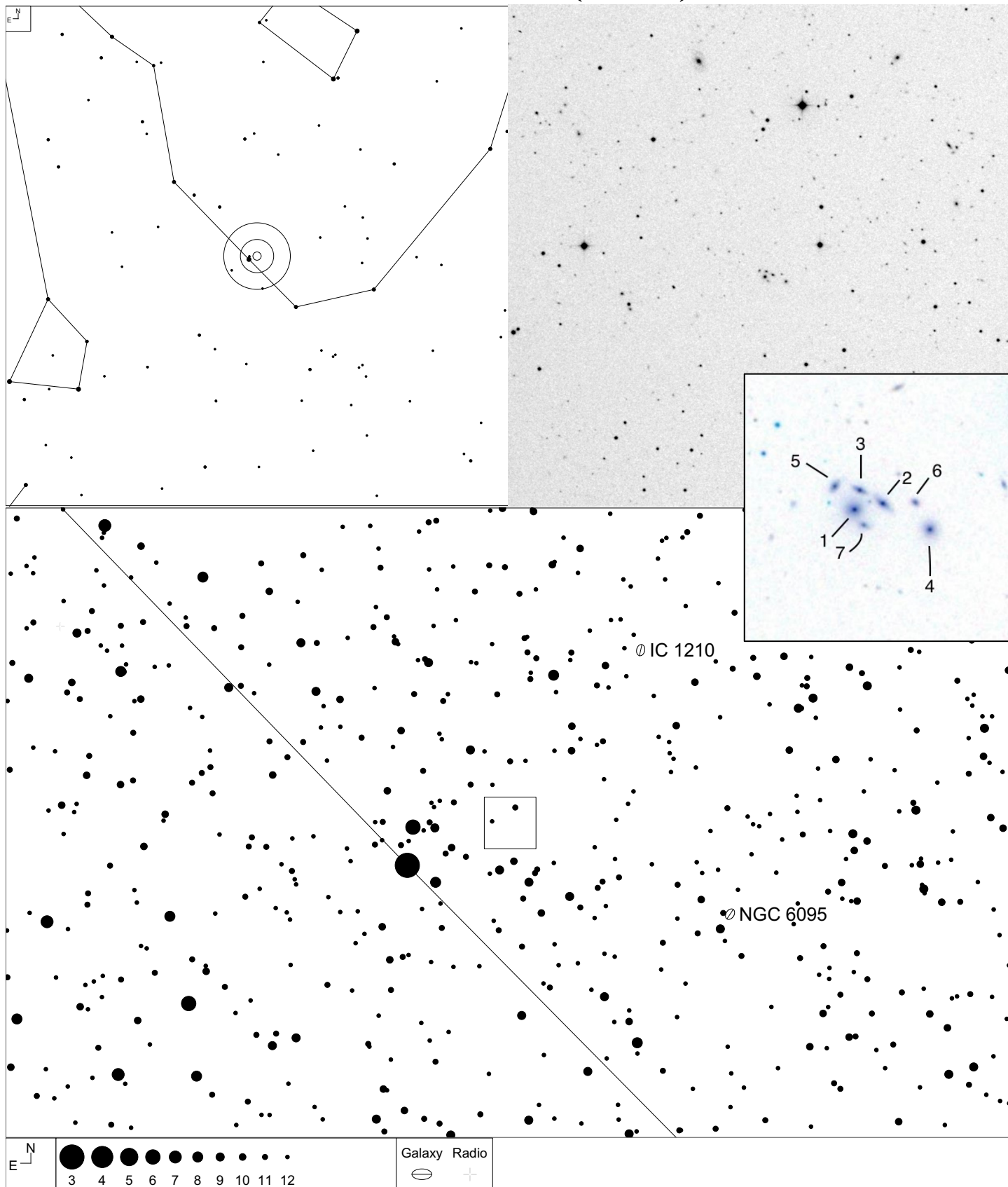


7 8 9 10 11 12

Galaxy

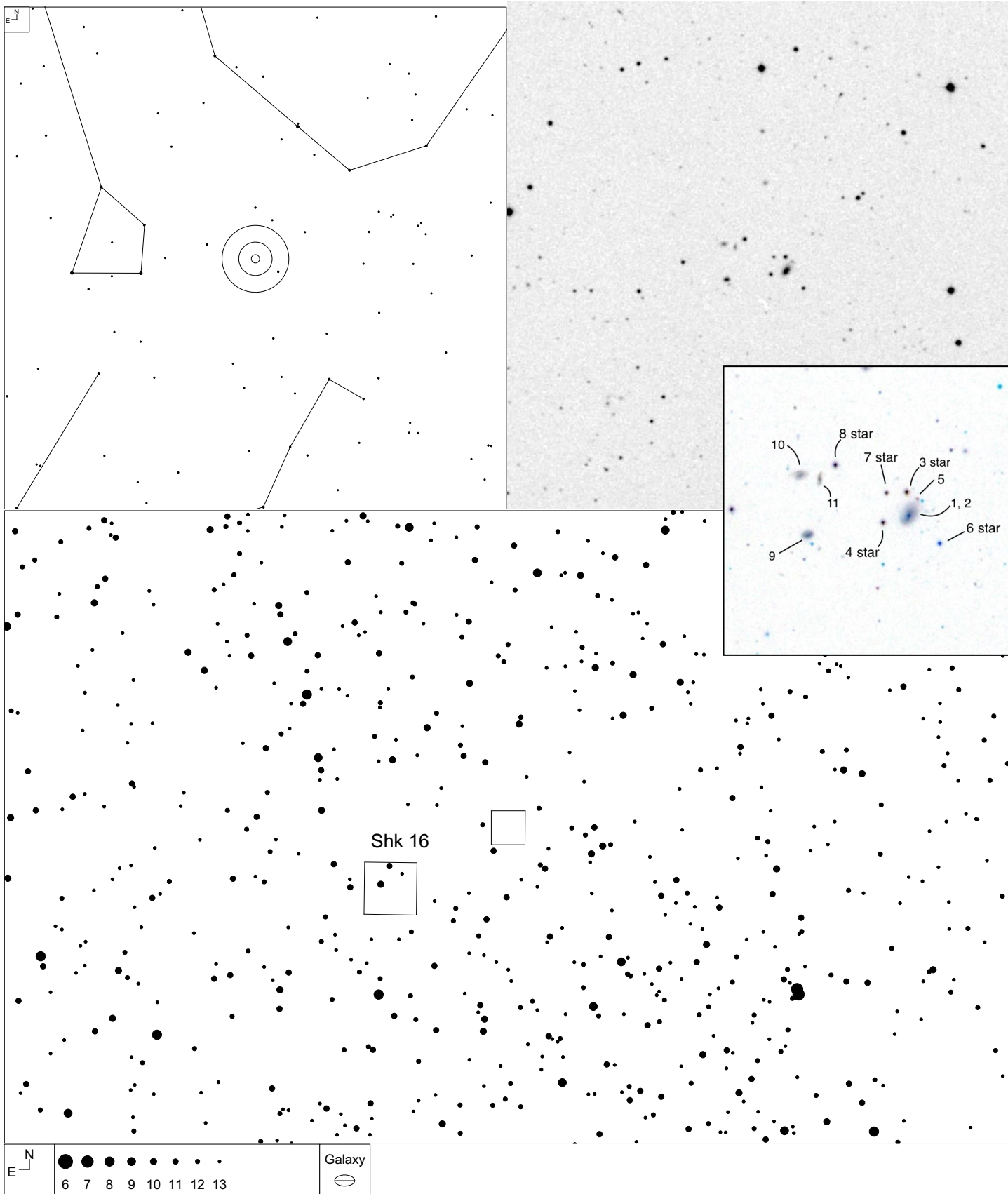
Object	RA	Dec	#	Mag	Size	Cmpt
	16 13 35	+64 21 34	11	16.8	2.4'	0.3

Shakhbazian 4 (Draco)



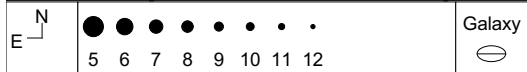
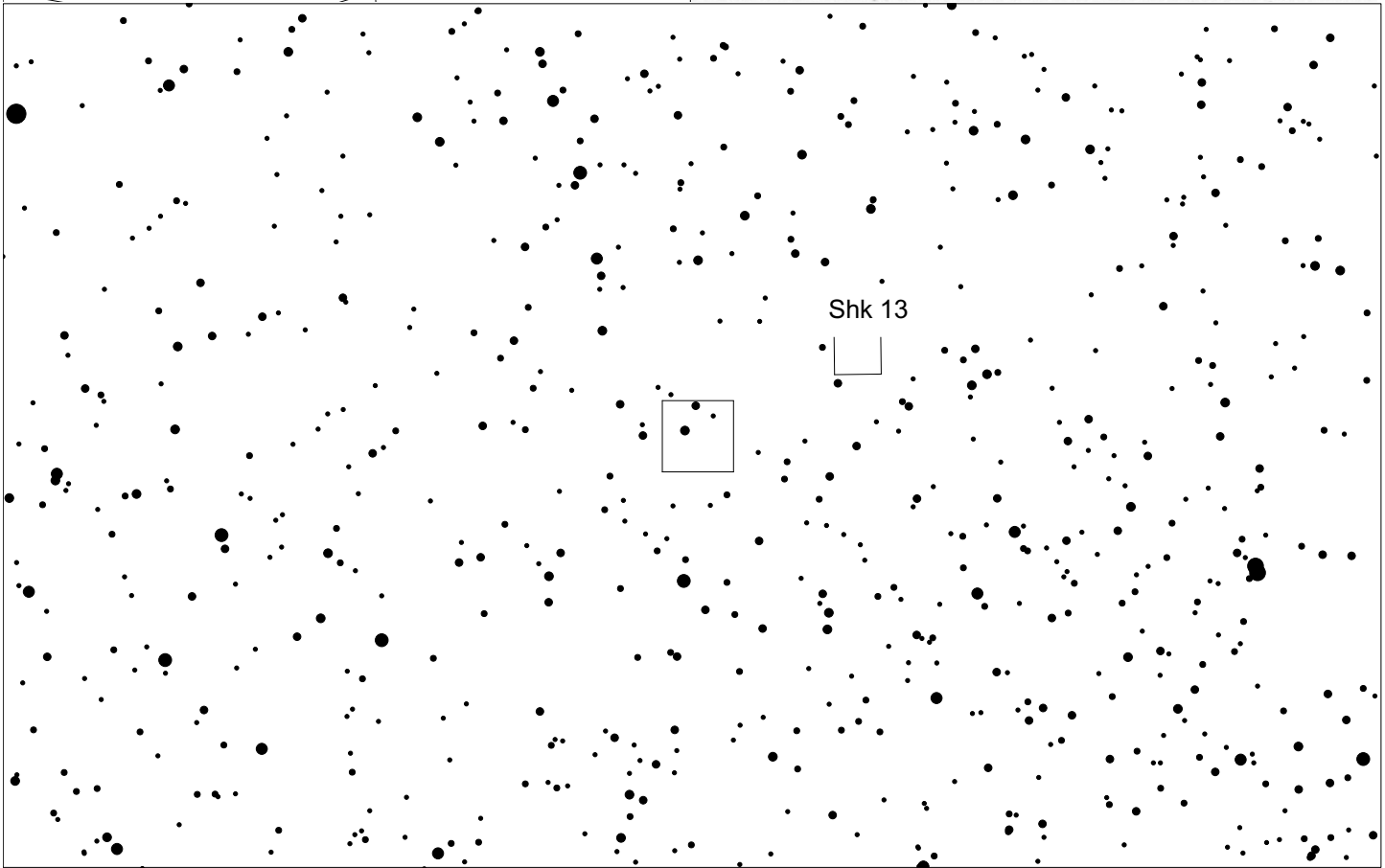
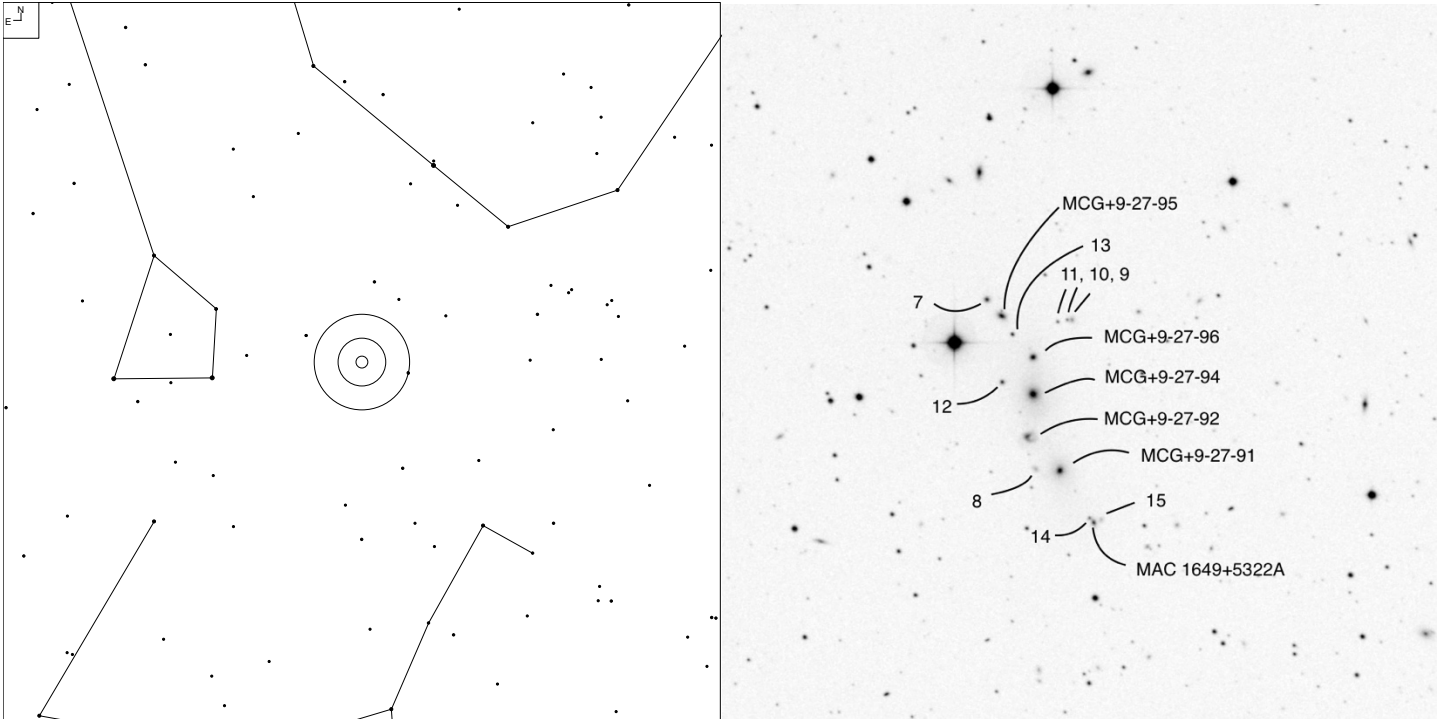
Object	RA	Dec	#	Mag	Size	Cmpt
	16 19 53	+61 43 12	7	17.04*	0.9'	0.9

Shakhbazian 13 (Draco)



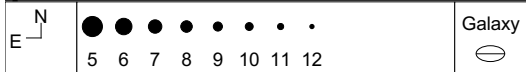
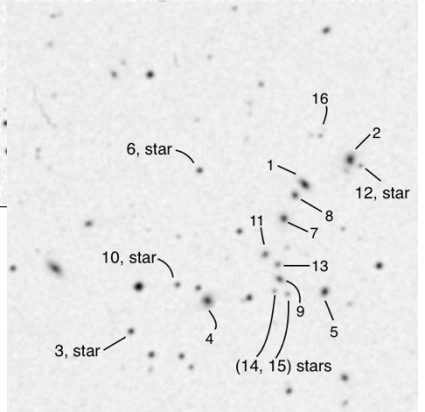
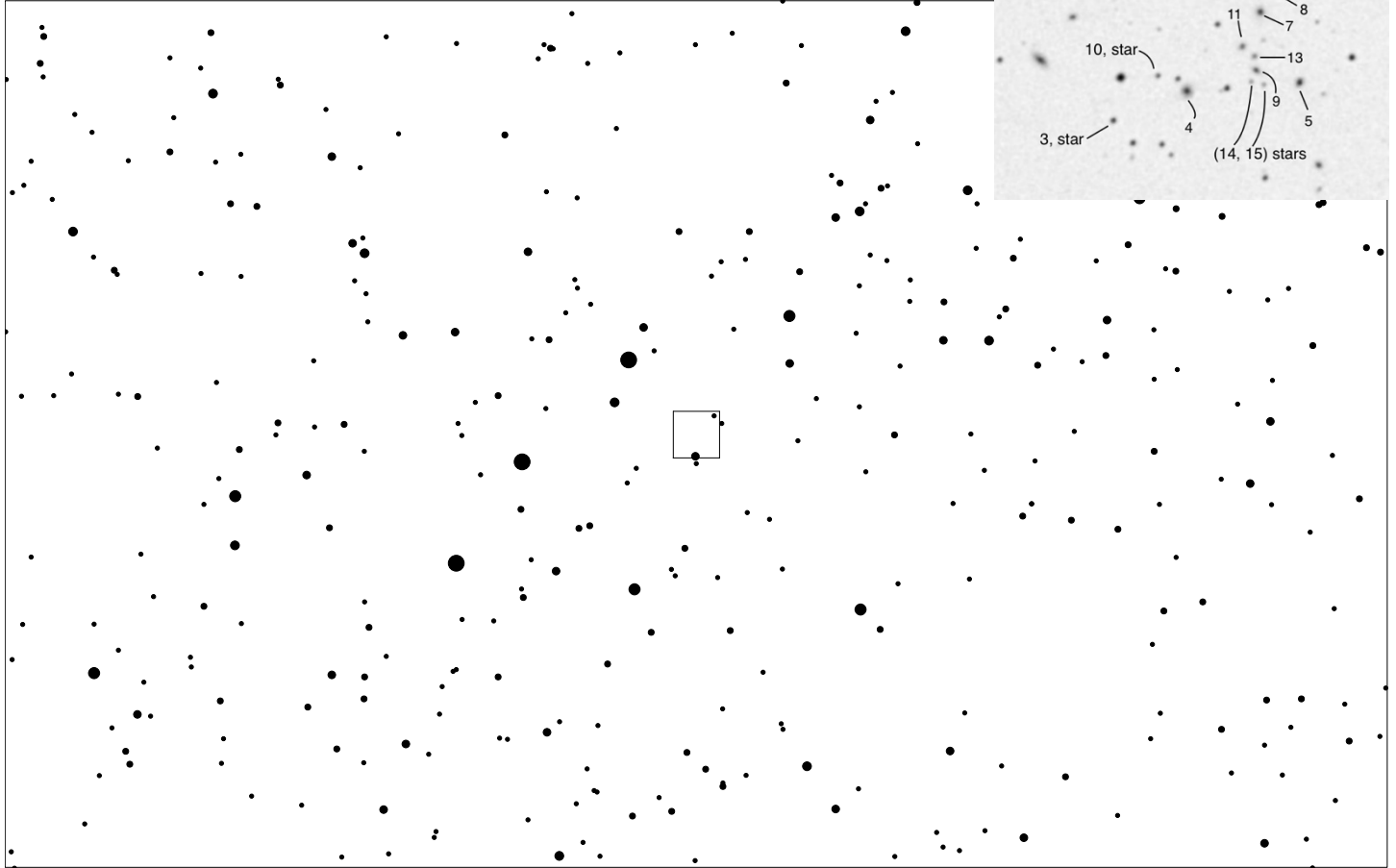
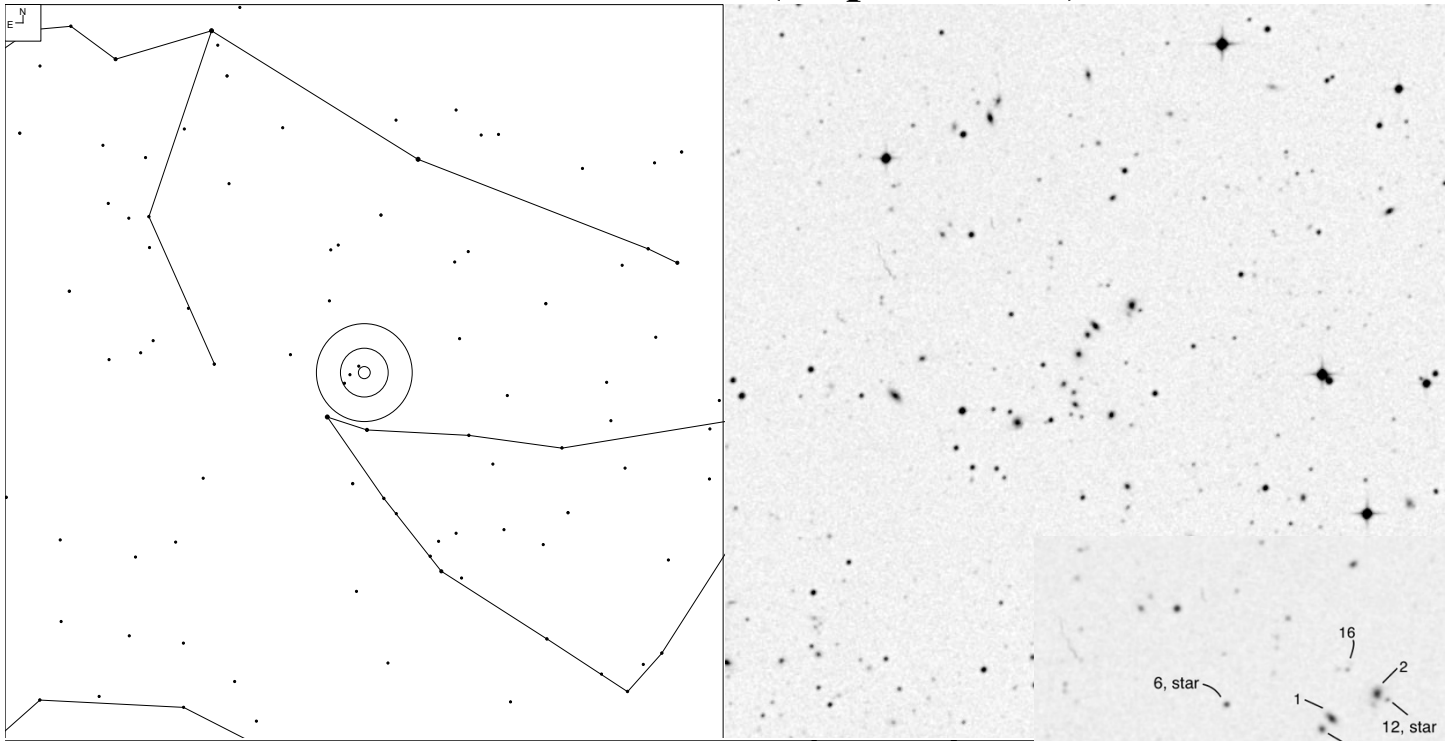
Object	RA	Dec	#	Mag	Size	Cmpt
	16 45 19	+53 42 41	11	16.5	1.7'	0.4

Shakhbazian 16 (Draco)



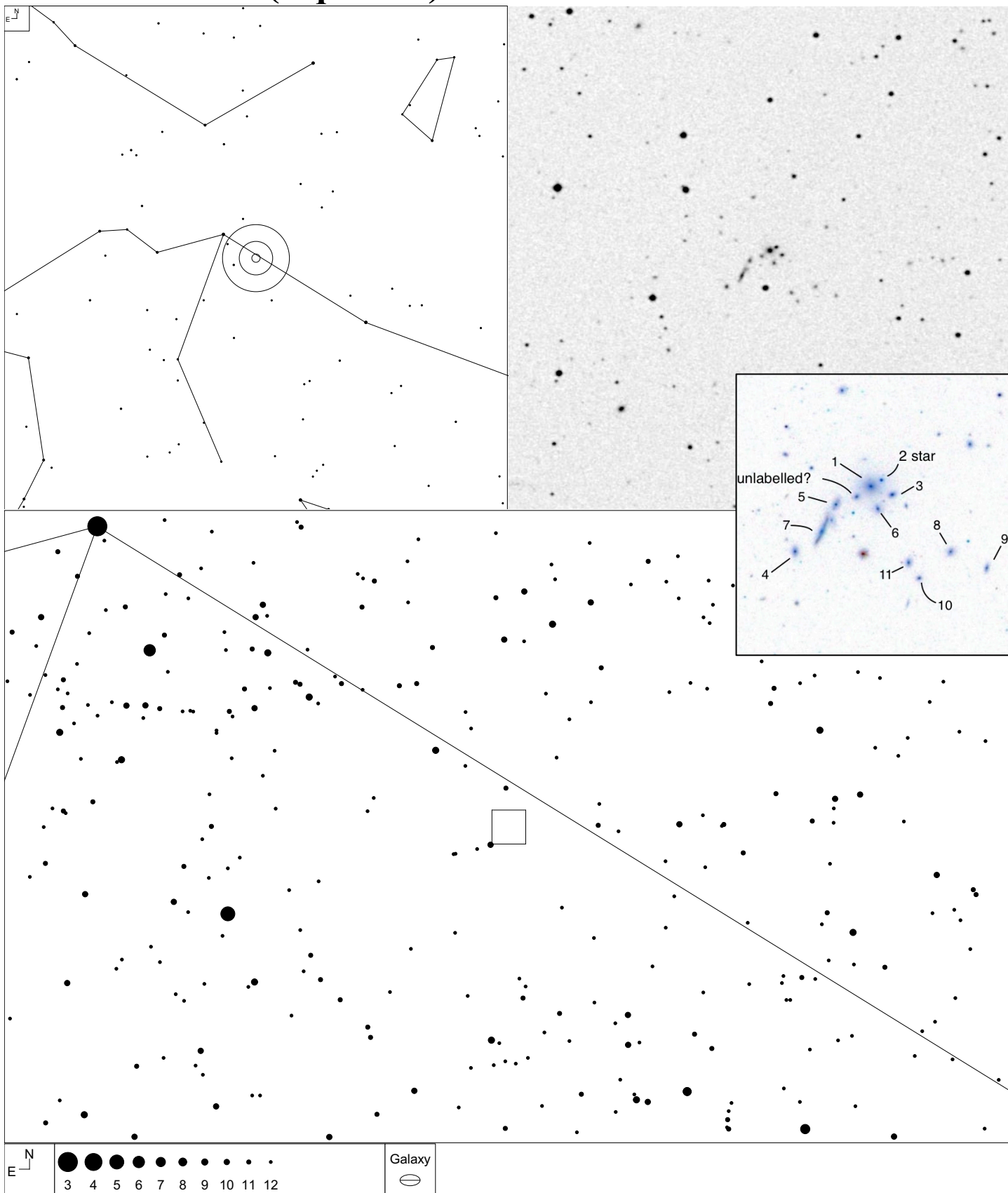
Object	RA	Dec	#	Mag	Size	Cmpt
Arp 330	16 49 11	+53 25 12	15	15.34*	5'	0.6

Shakhbazian 296 (Capricornus)



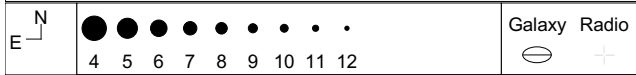
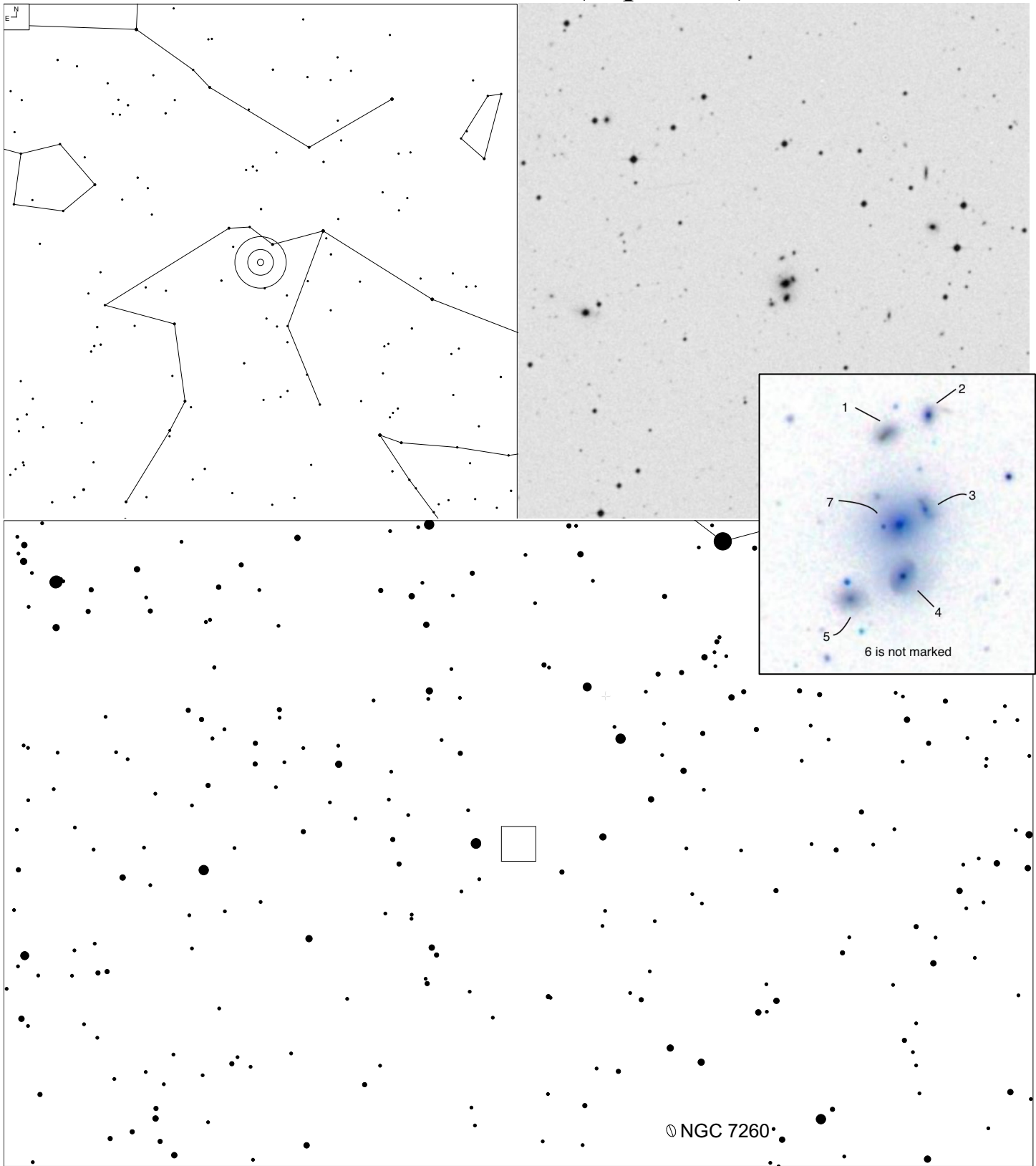
Object	RA	Dec	#	Mag	Size	Cmpt
AGC 2362	21 40 35	-14 18 21	16	17.81*	3.4'	0.4

Shakhbazian 81 (Aquarius)



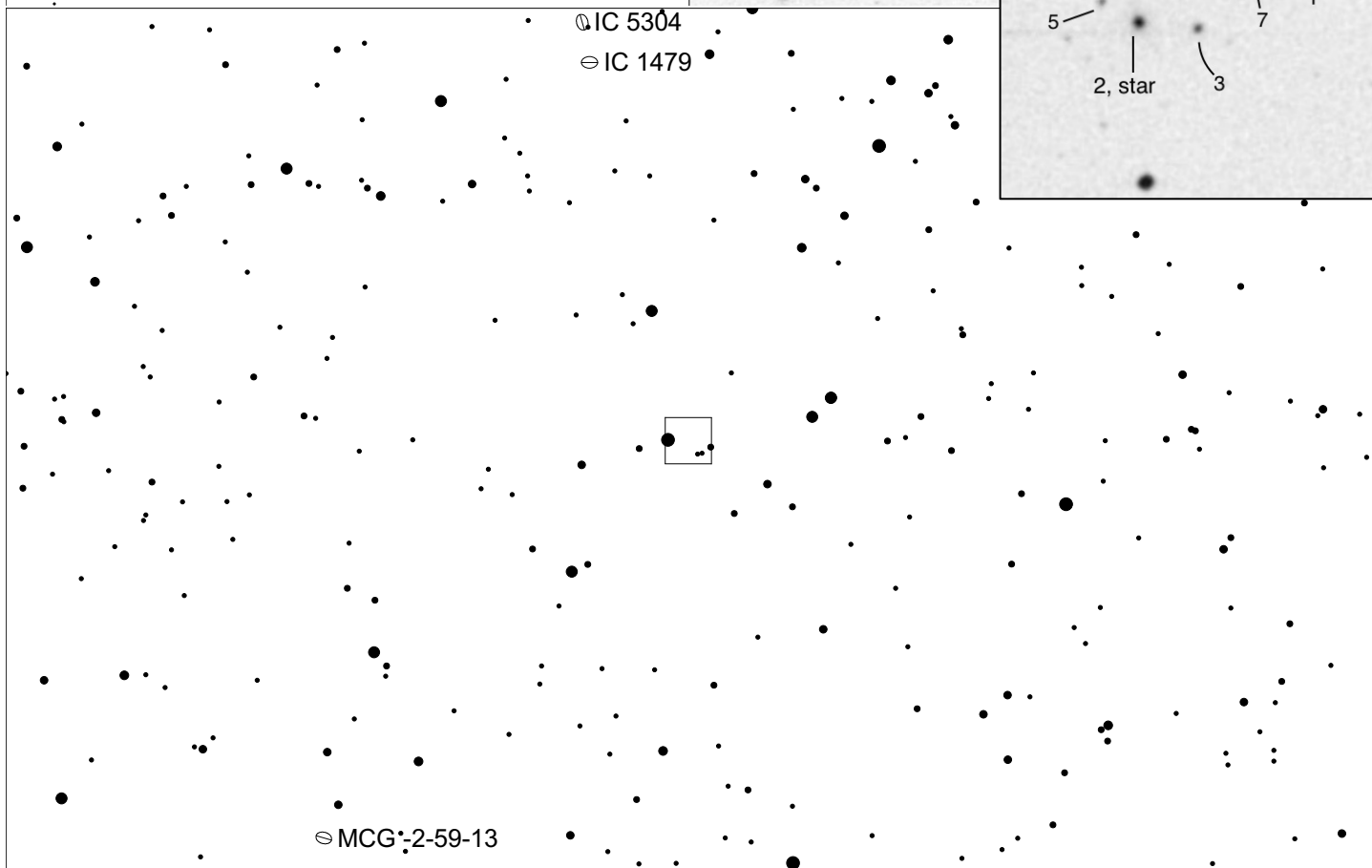
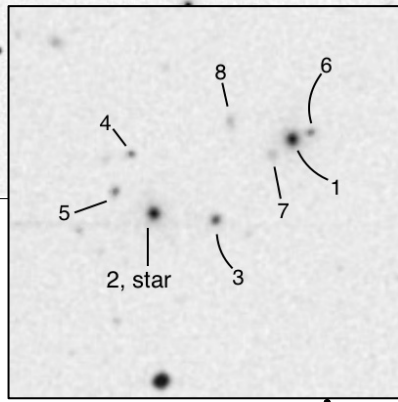
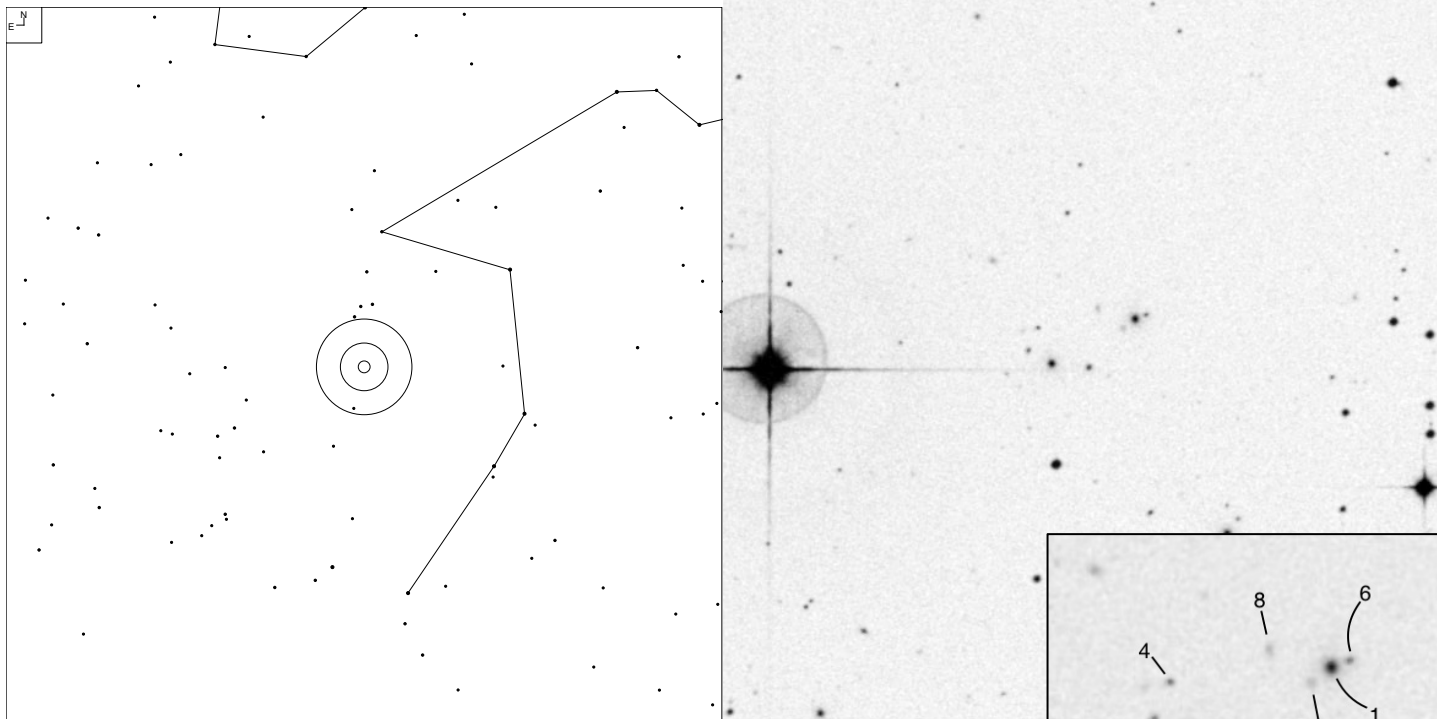
Object	RA	Dec	#	Mag	Size	Cmpt
	21 57 59	-01 44 39	11	17.75*	1.3'	0.8

Shakhbazian 331 (Aquarius)



Object	RA	Dec	#	Mag	Size	Cmpt
	22 25 27	-02 47 25	7	16.06*	1.1'	0.6

Shakhbazian 302 (Aquarius)

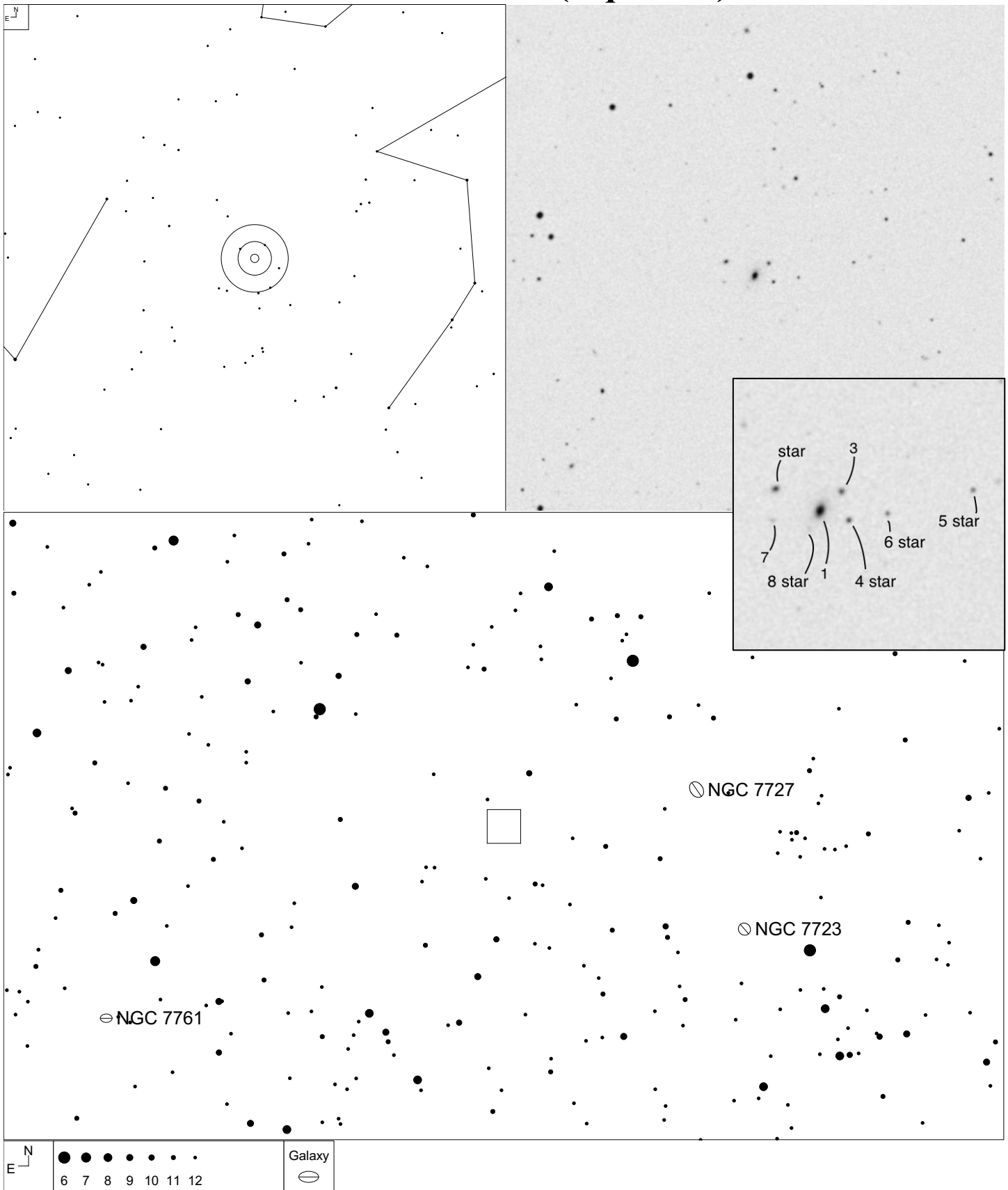


6 7 8 9 10 11 12

Galaxy

Object	RA	Dec	#	Mag	Size	Cmpt
	23 17 19	-11 42 36	8	17.34*	2.2'	0.4

Shakhbazian 304 (Aquarius)



Object	RA	Dec	#	Mag	Size	Cmpt
	23 43 40	-12 28 21	8	16.97*	2.6'	0.3

Additional Resources

Original Journal Articles comprising the 377 Shakhbazian Groups

Shakhbazian R.K. Compact groups of compact galaxies. *Astrophysics* Vol. 9, 1973, pp 296-304

Shakhbazian R.K. and Petrosian M.B. Compact groups of compact galaxies. II. *Astrophysics* Vol. 10, 1974, pp 6-21

Baier F.W., Petrosian M.B., Tiersch H., and Shakhbazian R.K. Compact groups of compact galaxies. III. *Astrophysics* Vol. 10, 1974, pp 202-211

Petrosian M.B. Compact groups of compact galaxies. IV. *Astrophysics*. Vol. 10, 1974, pp 291-298 and Plates

Baier F.W., Tiersch H. Compact groups of compact galaxies. V. *Astrophysics* Vol. 11, 1975, pp 146-155 and Plates

Baier F.W., Tiersch H. Compact groups of compact galaxies. VI. *Astrophysics* Vol. 12, 1976, pp 1-9 and Plates

Baier F.W., Tiersch H. Compact groups of compact galaxies. VII. *Astrophysics* Vol. 12, 1976, pp 263-274 and Plates

Baier F.W., Tiersch H. Compact groups of compact galaxies. VIII. *Astrophysics* Vol. 14, 1978, pp 157-162 and Plates

Petrosian M.B. Compact groups of compact galaxies. IX. *Astrophysics* Vol. 14, 1978, pp 356-361 and Plates

Baier F.W., Tiersch H. Compact groups of compact galaxies. X. *Astrophysics* Vol. 15, 1979, pp 24-27 and Plates

Journal Articles with Photometric Data and Refined Coordinates

Stoll, D., Tiersch, H., Oleak, H., and Baier, F. Photometric catalogue of Shakhbazian Compact Groups of Galaxies. I. *Astronomische Nachrichten*, Vol 314, No. 4, 1993, pp 225-267

Stoll, D., Tiersch, H., Oleak, H., and Baier, F. Photometric catalogue of Shakhbazian Compact Groups of Galaxies. II. *Astronomische Nachrichten*, Vol 314, No. 5, 1993, pp 317-360

Stoll, D., Tiersch, H., and Oleak, H. Photometric catalogue of Shakhbazian Compact Groups of Galaxies. III. *Astronomische Nachrichten*, Vol 315, No. 1, 1994, pp 11-61

Stoll, D., Tiersch, H., Oleak, H., and MacGillivray, H.T. Photometric Catalogue of Shakhbazian Compact Groups of Galaxies. IV. *Astronomische Nachrichten*, Vol 315, No. 2, 1994, pp 97-150

Stoll, D., Tiersch, H., and Braun, M. Catalogue of Shakhbazian Compact Groups of Galaxies. V. *Astronomische Nachrichten*, Vol 317, No. 4, 1996, pp 239-257

Stoll, D., Tiersch, H., and Braun, M. Catalogue of Shakhbazian Compact Groups of Galaxies. VI. *Astronomische Nachrichten*, Vol 317, No. 5, 1996, pp 315-332

Stoll, D., Tiersch, H., and Braun, M. Catalogue of Shakhbazian Compact Groups of Galaxies. VII. *Astronomische Nachrichten*, Vol 317, No. 6, 1996, pp 383-400

Stoll, D., Tiersch, H., and Cordis, L. Catalogue of Shakhbazian Compact Groups of Galaxies. VIII. *Astronomische Nachrichten*, Vol 318, No. 1, 1996, pp 7-24

Stoll, D., Tiersch, H., and Cordis, L. Catalogue of Shakhbazian Compact Groups of Galaxies. IX. *Astronomische Nachrichten*, Vol 318, No. 2, 1997, pp 89-106

Stoll, D., Tiersch, H., and Braun, M. Catalogue of Shakhbazian Compact Groups of Galaxies. V. *Astronomische Nachrichten*, Vol 318, No. 3, 1997, pp 149-162

A few interesting journal articles, but too many to list here. Some are as follows:

Robinson, Lloyd B. and Wampler, E. Joseph. Shakhbazian I: A Distant Cluster of Compact Galaxies. *The Astrophysical Journal*. Vol. 179, Feb 1, 1973, pp. L135-L139

Tiersch, H. Compact Groups of Compact Galaxies. *Astronomische Nachrichten*. Vol 297, Iss 6, 1976, pp 301-303

Tovmassian, H.M., Tiersch, H. Shakhbazian Compact Groups: Poor Clusters of Galaxies. *Astronomy & Astrophysics*, Vol. 378, 2001, pp 740-747

Tovmassian, H.M., Tiersch, H., et al. Photometric and Spectroscopic Study of the Shakhbazian Compact Galaxy Groups ShCG 31, ShCG38, ShCG 43, and ShCG 282. *Revista Mexicana de Astronomia y Astrofisica*, Vol 38, 2003, pp 275-289

Tovmassian, H.M., Tiersch, H, et al. Shakhbazian Compact Galaxy Groups IV. Photometric and Spectroscopic Study of ShCG 8, ShCG 14, ShCG 19, ShCG 22. *Astronomy and Astrophysics*, Vol 439, 2005, pp 973-979

Tovmassian, H.M., Torres-Papaqui, J.P., Tiersch, H. Isolated Shakhbazian Compact Groups. *Астрофизика*, Vol 53, No. 3, 2010, pp 353-362

Articles and Amateur Publications

Brazell, Owen. The Shakhbazian Catalogue – The Next Hicksons? *The Deep Sky Observer*. Issue 114, Oct 1998, pp 3-4

Wood, Mike. Shakhbazian Galaxies. *The Deep Sky Observer*. Issue 189, 2022, pp 11-13

Books

Harrington, Philip S. *Cosmic Challenge: The Ultimate Observing List for Amateurs*, Cambridge: Cambridge University Press, 2010.

Kepple, George R. and Sanner, Glen W. *The Night Sky Observer's Guide, Vol. 1 Autumn & Winter*. Richmond, VA: Willmann-Bell, 1998

Kepple, George R. and Sanner, Glen W. *The Night Sky Observer's Guide, Vol. 2 Spring & Summer*. Richmond, VA: Willmann-Bell, 1998

Steinicke, Wolfgang and Jakiel, Richard. *Galaxies and How to Observe Them*. New York: Springer Publishing Company, 2007

Stoyan, Ronald and Schurig, Stephan. *interstellarum Deep Sky Atlas*. Cambridge, MA: Cambridge University Press, 2015

Stoyan, Ronald and Glahn, Uwe. *interstellarum Deep Sky Guide*. Cambridge, MA: Cambridge University Press, 2018

Webb Society. *Webb Society Deep-Sky Observer's Handbook, Volume 5: Clusters of Galaxies*. Edited by Kenneth Glyn Jones. Hillside, NJ: Enslow Publishers Hillside, 1982

Websites

For the full list of 377 Shakhbazian Groups, see heasarc.gsfc.nasa.gov/W3Browse/all/shk.html

www.deepskyforum.com - The premier Deep Sky forum where advanced deep sky observers converge and discuss various aspects of deep sky observing.

www.cloudynights.com – Great resource for like-minded amateurs discussing most aspects of the hobby.

www.astronomy-mall.com/Adventures.In.Deep.Space/ - Great source of observing projects for all skill levels.

<http://ned.ipac.caltech.edu> - NASA-IPAC Extragalactic Database – NED

https://archive.stsci.edu/cgi-bin/dss_form - The STScI Digitized Sky Survey

Sources of Charts and Images

Charts by *Megastar version 5* Willmann-Bell Richmond, VA

<https://archive.stsci.edu/dss/acknowledging.html> - DSS images (Digital Sky Survey)

<https://skyserver.sdss.org/dr10/en/home.aspx> - Sloan Digital Sky Survey – Data Release 10

Revision History

Date	Revision
March 2010	All – Grouped by Constellation starting with Pegasus moving eastwards Shk 1 – corrected coordinates and finder chart Shk 6 – corrected coordinates
March 2012	Shk 6 – corrected coordinates and size based on NED data Shk 191 – refined coordinates based on NED data Shk 213 – refined coordinates Shk 219 – refined coordinates based on NED data Shk 360 – refined coordinates
March 2013	Refresh
March 2013	<ul style="list-style-type: none"> • Very minor enhancements <ul style="list-style-type: none"> ○ Enhanced TOC ○ Moved the index to the beginning ○ Enhanced recommended reading section
April 2013	<ul style="list-style-type: none"> • Added front cover
April 2024	<p>Major update</p> <ul style="list-style-type: none"> • Added additional groups (Shk 2, 4, 7, 8, 10, 17, 18, 20, 27, 31, 32, 39, 41, 43, 51, 55, 57, 67, 74, 82, 83, 95, 104, 105, 113, 119, 120, 123, 138, 131, 135, 181, 182, 186, 188, 212, 218, 220, 223, 244, 245, 253, 254, 257, 266, 278, 282, 285, 330, 344, 345, 346, 348, 350, 351, 355, 358, 359, 371, and 376). • Deleted Shk 21. • Added Intro section. • Added link to full Shakhbazian list. • Added Coefficient of Compactness (Cmpt) to give an idea how dense the group is. • Updated data throughout. <ul style="list-style-type: none"> ○ Corrected RA and Dec to the center of the group. Some of the RA/Dec in the original papers were not accurate. ○ Updated Mag using data from D. Stoll's, SDSS and/or NED. ○ Updated the number of members (#) with D. Stoll's figures. • Added SDSS inserts with marked members for most groups. • Major update to the bibliographic data.
May 2024	Added labels to inset images according to Stoll's journal articles. Corrected typos to # of members in several groups.